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ABSTRACT

On July 1, 1974, Camden County College was awarded a grant by the Fund for the Improvement of Post-Secondary Education for the purpose of developing an individualized instruction system for implementation across Camden County College. This system would allow students to proceed at their own rate through courses of study and eventually entire degree programs. In working toward these goals, a number of experts in the field were invited to advise Professor Giordano, the college's director, on planning and implementing individualized instruction systems. Dialogues between Professor Giordano and the following consultants are reported: Dr. Robert Toft, Dr. Kim Porter, Dr. Lee Harrisberger, Dr. Donald Tosti, Dr. Richard Heydinger, Dr. James O. Hammons, Dr. J. Gilmour Sherman, Dr. John Gallagher, and Dr. Robert N. Hurst. The data compiled in this report were fragmented into their component parts and utilized in the preparation of the first report on the project. (VT)

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APPENDIX

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THE NON-LOCK-STEP EDUCATIONAL SYSTEM

Consultants' Reports

Submitted by Professor Mario J. Giordano
Project Director

Camden County College
P.O. Box 200, Blackwood, New Jersey
June 30, 1975

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CAMDEN COUNTY COLLEGE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. ROBERT TOFT

On Individualized Instruction

September 3 - 5, 1974

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Post-Secondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campus to advise Professor Mario Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Dr. Robert Toft, who visited the College in the role of a consultant on September 3, 1974.

Dr. Robert Toft is the Dean of College IV, Grand Valley State Colleges, Allendale, Michigan.

College IV, the fourth college to be added to the Grand Valley cluster, is developing an individualized curriculum based on mastery learning of modules organized around single concepts or topics. Integrative seminars,

projects, and student learning contracts add a synthesizing component to the curriculum. The program has been particularly attractive to self-motivated learners and adults with limited free time.

Much of the educational process at College IV is centered around self-paced, multi-media modules as part of their individualized instruction system. Other methods of individualized instruction, however, are also used; i.e., small groups, seminars, irregular lectures, audio-tutorial, student-designed projects, and authentic-experience involvement. College IV uses a tightly structuralized individualized system during the first two years which evolves into a freer form of individualized instruction during the later years.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least 8 - 10 consultants. The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report, that will be presented to H.E.W. in June of 1975.

I ADMISSIONS

A. Q. *How does a student apply for admissions to your school?*

A. We have a new admissions form which I will send to you. Students either apply to one of these specific undergraduate, cluster colleges or to a category called "access" which is for those who do not wish to declair a college at this time but merely to accumulate some credits. Then, they also apply to a General Academic Program which is designed for students with specific learning difficiencies in reading, writing, or mathematics.

B. Q. *What are the admissions requirements?*

B. Each of the cluster colleges has its own set of admissions requirements.

The College of Arts and Sciences has a grade-point minimum while the rest of the colleges use a different set of criteria.

The General Academic Program uses a diagnostic test to check the student's ability to perform at college level.

The "access" category has no admissions requirements other than proof of graduation from high school or attaining 21 years of age.

In College IV, we will admit anyone whom we believe has college potential. We do have available a basic writing skills module which serves as a diagnostic test for their writing abilities. Similarly, we are developing a placement test in mathematics.

Several students who have applied to us after having been turned down by the other colleges have been instructed to do the basic writing skills module on their own to see whether or not they can handle the work of College IV.

C. Q. *What are the record-keeping forms and procedures used in the admissions sub-system?*

A. Demographic information is taken from the application form and punched into computer cards to build a student information system. If after screening by the admissions staff the student fails to meet the necessary admission requirements for the particular college or category, his or her application is sent to the admissions committee of that unit for review.

Once the student has been admitted, a form letter is sent from the admissions office indicating that, with a copy to the college or unit to which the student has been admitted.

D. Q. *When the student leaves the admission sub-system, what proof does he carry with him that he has been admitted to your school?*

A. The student's admit letter serves as proof as does the official notification to the college from the admissions office. At the time of registration, his or her name will appear on official lists and in the registrar's office and will be used to check for bona fide students after the registration process has taken place.

II REGISTRATION

A. Q. *Where does the student get advice about scheduling, curriculum and courses?*

A. In College IV, each faculty member serves as a student advisor. The first contact of the student with College IV is through the student orientation advisor, however. This person goes through a specific training program to be sure that he or she is well-acquainted with the procedures in College IV.

The incoming student is given an orientation booklet and views a video-tape on College IV. There follows a question and answer period with the student orientation advisor. Following that encounter, the new student then is assigned a faculty advisor with whom he or she talks about his or her specific program and curriculum. I will send you a set of orientation materials.

B. Q. *How does the Registrar know that the student has been authorized to enter classes for which he is registering?*

A. Certain modules in our curriculum hierarchy have specific pre-requisites listed. At the present time, there is no way of checking to make sure that a student has the necessary prerequisites before signing up for a given module, since the process of selecting modules is left entirely in the hands of the student. This is a loophole in our system at the present time.

The new computer system being designed will be capable of running prerequisite checks. In this way, the student could be contacted and told that he or she had not done the prerequisite work.

C. Q. *What are the forms and the record-keeping procedures involved in the registration sub-system?*

A. During this past year, two forms were used for record keeping.

The first is called the Module-Selection Form and a copy of that has been sent to you. The student fills out this form whenever he or she desires to begin work on a given module.

The second is the Daily Contact Worksheet, filled out by the faculty member. Each line of this sheet indicates contact with one student. This form has areas to indicate the purpose of the contact with the student. It may be anything from personal counseling to academic counseling to tutoring to mastery of an exam. A copy of this form has also been sent to you.

One difficulty with this procedure that we've found was that students would delay submitting module selection forms until they had, in fact, already mastered an exam. Thus, the computer was confused because it would receive the daily worksheet,

indicating mastery of an exam which, to its knowledge, had never been selected.

We have modified this now and will use one form, which will combine both of these functions. I will send a copy of this form as soon as it is printed.

As will be noted below, a student establishes a dollar balance in an account and, as he or she selects modules, that account is reduced accordingly.

In the new system -- whether or not a student has submitted the equivalent of the Module-Selection Form -- whenever he or she appears for tutoring on a given module, that information submitted to the computer will constitute registration for that module and the dollar balance will be reduced accordingly. This will get us out of the problem that I mentioned above.

There is also another form which is used to make corrections in the student's record, and a copy of that will be sent also.

For students cross-registering from the other cluster colleges into College IV, there is a Program-Selection Form for that college. The number of credits to be attempted in College IV is indicated by a code number of that form. Tuition is then paid to that home college. If the student fails to complete the work indicated in that particular term, he or she will receive a grade of "Incomplete" by the home institution until such time that the work is completed.

Students from the other cluster colleges may select modules in College IV at anytime throughout the year by filling out what is known as a Drop-Add Form. Copies of the Program Selection Form and the Drop-Add Forms will both be sent.

D. Q. *What proof does the student have, upon leaving the registration sub-system, that he has been: 1. Admitted to school; and 2. Gone through the registration system?*

A. At the time of usual registration in the Fall, Winter, or Spring terms, or at any other time for College IV students, the student is given, by the Record Office, a Permit-To-Register Form. A copy of this will also be sent. This form verifies admission to the school and indicates that the student had paid a certain amount of tuition.

For each module selected the student retains one copy of the N.C.R. Form, thus verifying his or her registration.

E. Q. *Can a student register at anytime during the year?*

A. Students in College IV may register at anytime during the year with the exception of the two weeks at Christmas, two weeks following commencement and two weeks following Labor Day when the College is closed.

Students in the other cluster colleges cross-register at College IV at anytime throughout the year as well. Normally, they do most of their cross-registration at their normal term registration times.

F. Q. *Is there a minimum and maximum number of courses for which a student may register?*

A. The minimum amount of credit for which a student may register is one-half credit in our "term" system. At present, there is not a maximum number of credits. In our contract study, which constitutes approximately one-half of what a student would do during their four years, the contracts vary in credit from a minimum of one to a maximum of 15. 15 credits is considered a full-time load for our ten-week terms in the other colleges.

Students may prepay tuition for any amount. They then select modules as they desire.

We encourage students not to attempt more than one or two modules at a time initially. Later on, they may have as many modules in progress as they wish.

III BURSAR

A. Q. *How does the Bursar know that the student who is attempting to pay for courses has been registered?*

A. All students who wish to pay for modules or courses must have a Permit-to-Register Form, which is issued by the Registrar's Office. This Permit-To-Register is issued only after verification that the student is admitted to the particular college or unit.

The student indicates to the Registrar how many credits he or she wishes to pay for and a Permit-To-Register for that number of credits is issued. The Permit-To-Register is then taken to the cashier who accepts the tuition and offers a receipted copy for the student.

B. Q. *What forms are involved?*

A. The Permit-To-Register form will be sent. The cashier keeps a daily record of all permits-to-register and these become a part of the computer run for the following day. At the time the Permit-To-Register is issued by the Registrar's Office, a record of that transaction is kept by the Reigstrar. This will later be cross-checked with the computer run from the cashier's office.

The list of permits-to-register from the cashier's office is entered into the computer system and establishes a new dollar-balance for the College IV student. It is against this balance that the student draws when he or she selects modules for study.

C. Q. *What is the tuition amount charged for each course or module?*

A. The tuition charge at the Grand Valley State Colleges is currently $13 per credit hour; thus, a one-credit module would cost $13, while a ½-credit module would cost $6.50 in tuition. Each module carries its unique identifying code; and, therefore, the computer program deducts the appropriate number of tuition dollars from the student's dollar balance when a module selection form is entered.

D. Q. *What form (or proof) does the student have that he has paid for a specific module?*

A. The student retains a stamped copy of the Permit-To-Register after paying the tuition at the cashier's office. This receipted copy is his or her proof that tuition has been paid. When a given module is selected by the student, he or she retains a copy of that form and that becomes their proof that they did, in fact, select that module.

IV FACULTY

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. At the present time, this represents a hole in our system. A student may come to a faculty member and ask for tutoring on a given module. The faculty member takes for granted that the student has paid for that module and tutoring takes place. We have had very few instances where free tutoring has resulted.

With the new contact form indicated, a student will be charged the price of a given module whenever he or she comes for tutoring. That still does not eliminate a first free session for that student; however, as the system grows, faculty will need to check the students against a paid list. The computer will be producing on a regular basis a list of all students and their tuition balance.

Ideally, I would like to go to some system where each student has a card similar to a credit card, which may be magnetized and entered into a small computer, and which would take care of checking for things like balance, a particular module selection, and so on. The computer will also produce for each faculty member a list of those students signed up for modules in his or her discipline. It will also provide a list for advisors of their students and what records they are achieving.

At the present time, we can consult the computer through our terminal and receive an up-to-date transcript for each student. This transcript shows all modules selected with the date of selection and all attempts at mastery with the date of the attempts. Mastery is indicated by the amount of credit and the date of the last mastery.

If a student fails to master a module, on the third attempt, he or she loses the credit for that module and must pay more tuition to repeat it.

B. Q. *What sort of orientation does the mentor give the entering student?*

A. The orientation for the student has been described. The faculty member may assume that the student understands the College IV system. The faculty member then talks to the student about his or her particular academic needs and gives advice on certain modules to be taken.

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, completion of modules, and the issuance of the next sequential module?*

A. All learning modules are for sale in the bookstore and may be purchased by anyone.

Each learning module indicates what materials are necessary for its completion and where those materials may be found.

The faculty have posted office hours when students may come for tutoring, or mastery testing. Mastery tests are graded immediately in the presence of the student; and, failing mastery, the student is given a diagnostic. At the time the module is mastered, the student is then advised on which modules should be attempted next.

Student tutors are also available at specified hours to help the students and, in some cases, to give mastery exams.

D. *What are the forms involved in this subsystem?*

A. Each faculty member prepares several forms of the mastery exam for each module and keeps these on file in his or her office. Completed mastery exams are also filed for future reference. Upon completion of mastery, or even failure to master, an entry is made in the new daily contact worksheet, mentioned previously. This information is then sent to the computer center to be entered in the student's record.

Each module has a module evaluation form attached to it. This module evaluation form, completed by the student, is the ticket to mastery for that module. Thus, the module evaluation form must be deposited in a locked box before a mastery exam is given.

This procedure has not been followed during this past year; and, as a result, we have had a very small return of these forms. However, new procedures for this Fall will force these forms to be turned in. These forms are then collected periodically by the evaluation team, and the data on them is summarized for return to the faculty. Thus, anonymity is preserved and yet the tabular data is available. A copy of the module evaluation form is found on the last two pages of each module.

E. Q. *What communication system is installed to inform other subsystems; i.e., Registrar, computer, administration, etc., of the progress of each student through the overall system?*

A. The primary document for reporting all student progress is the contact worksheet. A copy of this is kept by the instructor, one copy is given to the student, one copy is retained by the College IV office, and a copy is circulated first to the computer center and then to the Registrar's Office.

At periodic intervals, the computer generates reports on all students. These reports are sent to the Registrar's Office, to College IV, to the faculty member, and to the Business Office.

F. Q. *What number of weekly hours are spent with students by the average faculty member?*

A. The whole area of faculty workload is one which is being discussed now and will be the subject of a small conference this fall.

Because we have to please the faculty members themselves, the central administration, and the state legislature, a good deal of thought and effort is going into this definition. For the present time, on a temporary basis, we have defined a full-time teaching role for the faculty as maintaining 20 office hours a week for contact with students and generating approximately 320 student-credits per 10-week term.

The central administration recognizes that there are inevitable start-up costs in this sort of operation; and, during this past year just completed, they allowed us to count our faculty as half-time for purposes of credit generation, with the other half being devoted to curriculum development.

For the academic year just starting, our faculty will be considered 3/4 time and, therefore, must generate 3/4ths of the number of credits per term. They will also be maintaining 15 office hours a week instead of 20, which would be considered full-time.

We consider this an interim definition because the faculty perform a number of roles. Our definition of a full-time load must take these various roles into consideration.

Data from our evaluation team have shown us that some faculty, especially in mathematics, spend an average of 20 minutes per student encounter. In the social sciences, that figure rises to 45 minutes per encounter. It is clear that when we reach a steady state operation we cannot afford the luxury of 45 minutes per student encounter. Thus, we must define more carefully the type of encounter and a process of discrimination must be in operation. Thus, if within the first 10 minutes it is determined that the student is not prepared, he or she will be sent back for further study rather than taking the time of the faculty member for extensive tutoring.

A difficult problem in this area is in having the faculty see themselves as managers of instruction. One attraction of this system for our particular faculty was the increase in significant contact with students. The system does truly foster significant student-faculty interchange as compared with a traditional lecture system. However, it does put other demands on the faculty for efficient use of that exchange time.

G. Q. *What is the student-teacher load?*

A. Grand Valley, as an institution, must operate with a student-faculty ratio of 20.6 to 1. That ratio also applies, then to College IV.

Since each student, on the average, will generate 15.5 credits per term for each of the three standard academic terms, the faculty must then generate 20.6 times 15.5 credits per term.

H. Q. *Are there any special pay considerations involved?*

A. Grants from the National Science Foundation and from the Fund for the Improvement of Post-Secondary Education have provided for three-summer-faculty-writing workshops. These have been designed to maximize the use of faculty in the production of new modules for the curriculum. The faculty are paid for this summer involvement.

During the year, the faculty are expected to write modules as well as teach the existing curriculum.

At the present time, we consider the faculty member in all of his or her roles "wholistically". In the long run, I believe that this will be counter-productive.

I am designing a system whereby we will define as many as five separate, distinct faculty roles. It may be that each one of these faculty roles will have different persons serving in them.

For the present time, we have faculty who are paid full-time to tutor and write modules, to serve on task forces and committees, and to function as full-time faculty members. I also have contracts with one or more persons to write a series of modules in a given topic for a flat fee. Thus, one person agreed to write a 5-credit course for $1500. Another worked on another course and was paid 2/9 of his academic year salary. In a third arrangement, a faculty member from another college is writing modules in his particular area, and I am paying him a fixed number of dollars for each module completed. I also have arrangements with faculty to tutor and test modules with no involvement in writing.

These persons are paid, at the present time, $10 per student credit hour generated. Thus, a student taking 1 credit module, and mastering it, would result in the payment of $5 to the instructor. This is a very attractive mode for faculty who wish to moonlight. I also have faculty who are paid $5 per hour for their help in remedial work.

We have just completed an arrangement with a high school, 20 miles from campus, whereby the faculty will serve as adjunct faculty to College IV and will tutor their best senior students. Those students will become College IV students and earn credit while still in high school, for college work. The faculty, in this case, will be paid $10 per student credit hour for those credits mastered.

1. Q. *How is a professor's role changed as compared to those who are engaged in the lock-step educational system?*

A. I will send you a faculty, activity-analysis form and a summary of the report from our evaluation team which outlines the use of faculty time during this past year.

A primary consideration for faculty in a time-free system is that all of the curriculum which is available must be on line all of the time. Thus, the mathematics professor must be ready and able to answer questions, from minute to minute, ranging from basic arithmetic through post-calculus. This puts an enormous demand on the resources of individual faculty members to keep up in the whole of his or her discipline.

Because of the pressure of students coming through the curriculum, faculty no longer can have the advantage of "shooting the breeze" with students as they might in a traditional system. They have to be ready to give pointed advice and to ask pointed questions. The encounters must be greatly shortened in time and increased in content.

Even though all of my faculty were chosen by me for their skills and willingness to work in this pedagogy, some of them are finding it difficult adjusting to the realities of this mode of teaching. The primary rewards for faculty in this type of system, I believe, must come in the area of contract-learning. It is through the contract that the faculty member can draw the student into his or her own research area. In our use of para-professionals to do the teaching of skills and cognites, we will free the faculty to engage in research and teaching in their own specialty area.

V LRC

A. Q. *What is the system for checking out and returning learning modules from the library?*

A. All module booklets are for sale in the bookstore. When the learning module requires a textbook as a part of it, that textbook may be purchased in the bookstore, may be rented from the bookstore, or may be checked out of the reserve section of the library.

Because an individual learning module should constitute only about 1/10th of a traditional course, we do not wish to penalize the student wishing to do only one module by forcing him or her to buy the expensive textbook.

In the case of the rental system from the bookstore, students pay the full purchase price of the book when he or she takes it. When he or she returns it, a refund is given which reflects the difference between the purchase price and the amount of the rental fee. For those students keeping the book several weeks, the rental fee approximates the total cost of the book.

Each module lists all of the materials required for its study and the location of those materials. In many cases, these will include audio-cassettes, slides, film loops, or vidio-tapes.

B. Q. *Do you have study carrels equipped to handle AV' equipment?*

A. There are study carrels in the library which are equipped with two-way audio-vidio connections. A student may request a given vidio-tape or audio-cassette from the carrel and it will be projected from the A-V Center. The A-V Center itself also has study carrels with similar capabilities.

In the A-V Center, students may check out audio-tapes for use in the Center. They may also offer a tape of equal quality in return for a given recorded tape. The tape is then theirs to keep. We have a device for mass reproducing audio-tapes.

In order to increase the portability of our modules, there are also available small tape recorders and slide viewing projectors. During the past year, there was no deposit required for the use of these; however, we found that students would keep them for long periods of time, thus depriving other students of their use.

This Fall, we will institute a system whereby students must pay a deposit equivalent to the full price of the unit in order to check it out. This will encourage students to buy their own or to make other arrangements. Wherever there is a hardship, however, students may be assured of getting their refunds when they return the equipment in good order.

C. Q. *Is a record of time spent at carrels kept by the LRC?*

A. For those tapes and other A-V material checked out at the LRC for the use in the Center, the amount of time spent is recorded. The student must deposit his or her activity card or driver's license to obtain those materials; and, thus a record is kept. All audio-tapes that are released from the A-V Center are kept track of so that we know which student used them.

D. Q. *How do the LRC personnel know that a student is authorized to check-out a certain learning module?*

A. At the present time, the LRC personnel do not know whether a student is authorized to check out a given set of materials. Until this becomes a problem, we would like these materials to be available to all students, whether or not they have paid tuition. Many students, we find, are purchasing our modules in the bookstore and checking out the materials to study on their own. They may be doing this as adjuncts to traditional courses in the other colleges. In some cases, they are doing this and then coming to College IV, paying a test fee for a one-shot attempt at mastery. If they are successful, they can complete the work for their degree at about ¼ the cost of tuition. We see this as an advantage, not as a disadvantage.

E. Q. *Are special personnel required for the LRC and the module production lab?*

A. The Audio-Visual Center serves the entire campus; and, therefore, has its own staff. College IV modules and materials are a part of that offering; and, as such, are not charged to us directly. Module production will be covered later.

At the present time, there is no all-college module-production laboratory; however, the Audio-Visual Center does have facilities for producing movies, and vidio-tapes, and these can be scheduled. The schedule is very tight since the one studio serves the entire campus.

VI MISCELLANEOUS

A. Q. *If a student is to perform the activities comprising a learning module away from the campus, how are the hardware requirements monitored?*

A. We find that many of our students already own cassette players, and some have slide-viewing machines. For those who do not, we make arrangements through the A-V Center to loan them, as I indicated previously.

One of our former AV personnel is developing a small viewer for 8mm film loops which can be produced in quantities at a low price. We intend to standardize on the use of the Phillips audio-cassettes and the technicolor super 8mm film loop. I will speak more on this when I answer your question on module production.

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. In mathematics and english composition, we have remedial modules available. Students in both areas are given a diagnostic placement test. Failing to master this test, the diagnosis shows which areas are defficient and they are cycled back to those remedial modules.

At the present time, these remedial modules do carry college credit and count towards the 180 credits necessary for the degree. It is our hope in the future that, for certain areas such as mathematical skills or composition skills, that we can set up a competence measure. Thus, students may demonstrate their competence in this area and avoid having to take specific modules.

In our utopia, all of the "requirements" for the degree will be in the form of competency measures; thus, in that golden day of the future, a student will come to College IV and say, "Examine me for the degree." We will then examine the student and, hopefully, offer the degree.

C. Q. *How are the educationally disadvantaged, minority students, and "fast students" provided for in your system?*

A. At the present time, there is a distinct lower limit to the remedial work available in english and mathematics; so, those students who are truely educationally disadvantaged will not be able to make it in College IV. Since most of our modules are print-oriented, students must have good reading skills in order to achieve.

We do, at Grand Valley, have a program called the General Academic Program, which is designed for the educationally disadvantaged

and includes many minority students. Here students are given classroom help with a classroom teacher. Point deficiencies as low as fourth and fifth grade reading levels may be detected and worked with.

For those who are simply slow, College IV offers them an advantage to complete their work without reference to a time frame. We find, for example, that many students fear mathematics; thus, they will take twice as long to achieve mastery of their mathematics modules as they do in some of the other areas. This is a perfectly acceptable use of the time-free format.

I can conceive of students taking four years to achieve the minimum mastery levels in mathematics while moving on through perhaps the social sciences or humanities at a normal pace.

For the fast student, College IV is ideal. We have several students who will complete a four year degree in less than two years. It is clear that there may be a burn-out period for some of these exceptionally fast students.

One of the reasons why contract learning must constitute at least half of the curriculum is that the ability to perform well in the small-bite, learning modules is not necessarily providing the students with the skills that they will need to perform well in their jobs after college. The format of the learning contracts whereby the student must, once again, institute a time frame, a series of expectations, and guidepoints to the achievement of those objectives -- is far more critical for success after college.

One of the difficulties in this type system is that the fast students are constantly pushing the faculty for modules which are not yet developed. This has led to a couple of cases of ulcers among the faculty during this past year. Of course, time will take care of this. As the curriculum is developed, the students will no longer need to push as much..

D. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. One of our most difficult problems is selling College IV effectively to students. Grand Valley is a cluster of colleges, each with its own particular philosophy and educational style. However, the three-county area which we serve remembers Grand Valley primarily as the College of arts and sciences with its traditional programs. Thus, each one of the new colleges has had difficulty in presenting its unique programs. The admissions counselors, as they go on the road, have particular difficulty in 20 minutes explaining four different graduate approaches.

Our most effective methods so far in attracting students have been television, radio, and newspaper advertisements. For most of our students, who are older than the traditional 18-year old high school graduate, the ideas of the flexible time base and

lack of classroom competition have been the major selling points. Many of our older students who have never been to college fear the classroom competition with the younger, faster students. Thus, they see the advantage of being able to work alone and not display their ignorance and lack of ability to all those around.

The fact that they can arrange their college work around their home life is important. We have a fireman whose shift changes each two weeks thus keeping him from any kind of any regularly scheduled schooling. We have a salesman who is on the road four days a week and takes the modules along to study in his motel room. We have many housewives who come out at irregular intervals when they can find babysitters or when the children are not ill.

Word of mouth has been one of our most effective means of advertising. Housewives will tell those in their coffee club about the college, and that spreads the word. We have quite a number of veterans in the college who like the freedom of the system, for it allows them to carry on another job while they are studying. They have been effective in telling each other about the system.

One of the deficiencies here, however, is that the system has allowed for veterans to sign up for credits and not complete them. Thus, we have had a few freeloaders who are now in trouble with the VA because of it. We are plugging these loopholes.

We have a display designed to take to the shopping malls and believe that this will be quite effective in promoting the College.

In our view, sending posters to high school counselors is relatively ineffective. Last year we invited many high school counselors to the campus for a free lunch and discussion of Grand Valley and its programs. I attended almost all of these luncheons and felt that they were a waste of time. For the most part, high school counselors really don't give a darn about finding places for their students.

E. Q. *Do you require your producers of learning modules to demonstrate competence in their area before employing them in your system?*

A. My initial faculty were all persons who had developed modules in other places. Thus, I know that they had both the subject matter competence and the specific technical skills for writing modules.

Additional writing faculty whom we have brought on have not been previously tested for their ability to write modules. In some cases, this has led to a good deal of wheel spinning; while in others, they have caught on rather quickly. We do give them the two modules on writing objectives and writing modules. In addition, we steer them to Mager's book on writing behavioral objectives and to a couple of other manuals on writing objectives and instructional activities.

Up to this point we have not had the specific materials for training people in the writing of modules, nor have we had sufficient funds that we could put them through their training course.

This is really an area in which we are deficient. What we do with the modules which are produced is to send them to the faculty colleague in the same discipline in the other colleges in the cluster for review and comment. The second part is to ask each module producer to select a colleague in his or her discipline in some other distant institution and send the module off for comment. This second part has not operated very well yet and has been rather sporadic. One difficulty is that we do not have money for such reviewers to reimburse them for their time.

F. Q. *Do you have an educational technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

A. At this time, we do not have an educational technology workshop for our personnel. Through the Grant, I do have a media person who is skilled as a movie maker and still photographer. We also have some student graphic artists working part-time. These people can give assistance to the faculty in the use of A-V media. They can offer no help in the skills of writing objectives or learning activities.

VII EXTRA COLLEGE ASSISTANCE

A. Q. *To what extent are off-the-shelf learning modules (commercially produced) used in this system?*

A. The faculty are encouraged to purchase and use any and all commercial modules which they consider to be adequate. An interesting phenomenon is that most faculty consider most other people's materials as inferior and unsuitable.

At our first faculty workshop, two summers ago, I gave the faculty copies of all modules that I had solicited from individuals and examination copies of commercially produced materials in their areas. Almost to a person, they agreed that the materials I had gotten for them were not suitable. As the summer wore on, however, and they realized the difficulty in producing their own, these materials looked better and better. By fall, they were adopting and using materials much more freely.

The biggest barrier here, I would say, is professional pride. There are many self-contained learning modules available commercially, and I believe that these should be used to the fullest extent possible. We have entered into agreements to furnish to other schools copies of our modules so that they do not have to produce their own. One of the points of the Grant from the Fund for the Improvement of Post-Secondary Education was that we should not be re-inventing the wheel.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

A. We have not used outside consultants in each of the discipline areas for the production of learning modules. We have brought to the campus several persons -- such as Sam Postlethwait, who has experience in this area -- to talk with the faculty in general. During our first year of operation the faculty were so busy and so harrassed by the number of things to be done that they considered the visits by consultants an invasion of their precious time. Thus, we did not bring to campus as many consultants as we had planned to use. I will be bringing more during this academic year, for I feel that the climate has changed somewhat and the faculty can now appreciate the value of outside consultants.

Once again, we are in a transition in thinking regarding the use of specialists for module writing. At the University of Michigan Dental School, they have a five million dollar grant from H.E.W. to produce a two-year dental curriculum. They have specialists in graphics, specialists in movies, specialists in writing of objectives, etc.. Here the degree of specialization is so great that each of the module writers must learn, in fact, the subject matter of a particular course before they then can turn it into learning modules.

With our very limited resources and chances for getting any significant amount of money being rather nill, we have taken the opposite approach, that the subject matter expert must learn how to write the learning module. We realize there is some slippage in this, but still feel that the modules can be written with a high degree of effectiveness, even by persons who have not had much formal training in this area. Perhaps time will show that we're wrong.

As I indicated to you earlier, we are looking at ways in which we might bring about some greater degree of specialization. We might, for instance, find that certain faculty are far better as module writers than are others. In these cases, we would try a contract with them to write the modules while substituting other persons for the teaching of them. We will probably not, however, move so far as to have module writers as specialists regardless of the discipline involved.

VIII PLANNING YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year; i.e., production of learning packages, developing of systems, etc.*

A. During the planning year, one has to try to anticipate all of those areas of activity which will begin simultaneously with the introduction of the program. In the outline I have provided, I have listed 13 items. This is not by any means exhaustive, although it is exhausting. The items are listed in an order which expresses both chronology and priority. There certainly will be deviations from this, but it gives a general picture.

1. *Analysis of Student Needs and Problems*

Here we will find students who are preparing for careers, some for pre-professional trainings, and others simply for leisure education. You must account for differences in motivation and life style which may lead to scheduling difficulties. Attention must be given to the social life of those students, to facilities, and to personnel for tutoring.

We also had to include provisions for a student government function. One problem for students in a system such as ours is that many feel isolated. For some students, the faculty or tutors become "father confessors."

2. *Formulation of Educational Philosophy*

Only after you have done an analysis of student needs and problems can you properly formulate the philosophy which will govern the education! Too often we design the system first and then see if there is anyone who can make use of it. In your case, as in mine, the design of the system has come about because of needs which we have seen. On the other hand, great care must be given to looking at the spectrum of needs before the pieces of the particular design are put into place.

3. *Curriculum Design*

Since we operate within a general liberal arts framework, we had to consider, among other things, degrees to be offered requirements for the degree, and distribution of materials, to fulfill the traditions of a liberal arts degree. At the same time, we had to provide specialized training for those not aiming for the degree.

Conscious decisions had to be made regarding things to be included and things to be excluded. For example, College IV

will not offer music, drama, or physical education since these are available within the cluster.

A decision regarding the disciplinarity versus the interdiscipline nature of the curriculum has to be made. In our case, the use of learning modules and contracts forced us to examine the hierarchy of learning for each discipline.

4. *Modes of Instruction*

For the freshman-sophomore years, the primary mode of instruction is the individualized learning module. In addition, there are group discussions. For students who have completed a group of modules, either within one discipline or cutting across several disciplines, the faculty are available to design special integrative or cap-stone modules. Thus, a student completing all of the modules in organic chemistry might be given a cap-stone module forcing him or her to synthesize an organic compound or to write a paper.

The contract study is outlined in the catalog section which I left with you. Contracts may be either individual or group. They may be of two types: either for one to five credits or six to fifteen credits. Students may write a contract to actually create a module in some area.

Each contract has two or more faculty as advisors. The larger the contract, the greater the involvement of the faculty group.

This Fall, we will be experimenting with post-group activities. We will solicit student interest; and, when we have a significant number of students, we will begin a group contract, which may start with a series of seminars and then branch off into individual or small group study.

There is no style of pedagogy which we will not attempt; however, we force that each one must be on an ad hoc basis and not tied to a specific calendar.

5. *Faculty*

Things which must be considered in this category are hiring practices and objectives, contract form and content, teaching load, promotions, advising function, professional development, evaluation of teaching performance, and governance -- including the use of committees or task forces, and faculty meetings.

Where governance is concerned, it is advisable to have the system of governance established before the faculty are hired. The experience of Grand Valley and two of the colleges has shown that doing it in the reverse direction leads to a great deal of anxiety. The faculty are better able to cope with an existing system and to bring about an orderly change in it

to suite their needs than they are to be given the task of developing that system initially.

6. *Support Units*

I have listed 8 different support units which are essential to interact with during the planning year. These include admissions -- where one has to set entrance requirements, to develop catalog copy, and to work out the problems of continuous registration.

A significant challenge in working with admissions is the appropriate marketing of the new college or program. It has been my experience that the admissions officers are relatively ill-equipped to deal with the variety of programs and colleges which Grand Valley now has.

In working with the records office or registrar, one has to set up the appropriate type of grading system to accomodate a mastery system. One has to deal with the question of "incompletes" and whether or not they will be used. Transcripts must be designed to accomodate this new form of instruction and other forms for transfer, drop-add, refunds, etc., must be designed.

Discussions with the computer center director should take place because of the need to develop specific programs for record keeping and financial reporting. As I indicated to your, we have an extensive computer-managed instrucional system that operates for us. We developed a data base which is useful for all types of analysis of student progress. This required weekly meetings for several months with the computer center staff, followed by approximately 9 months of programming and testing time.

Problems with the business office include the establishment of student accounts so that students may pay tuition whenever they wish and then draw upon it for doing their modules. That will not be a problem in your system, however.

We have to face laboratory and other fees such as audio-visual fees. There is a necessity for having a deposit or breakage fee to cover the loaning of equipment from the A-V Center.

One of the major areas of concern during the planning year is with the Audio-Visual Center. Here you have to face the problems of media production (who is going to produce the associated media), check-out of modules and materials, quality control on the Audio-Visual materials, budget for this extra operation, rental fees to cover the cost, equipment needs, and inventory control.

Arrangements have to be made with the bookstore to stock and sell the modules. We developed a rental plan of which you

have a copy. The bookstore also had to stock and sell all reprints, textbooks associated with the modules, and audio-tapes to be used in exchange for tapes from the audio-visual center.

Interface with the library was necessary to assure that a system of reserve books would be available for the students. Wherever a module references a standard textbook, we will have a copy or more of that textbook on reserve in the library. Thus, a student may buy the basic module and then check the textbook out from the library to save money.

Finally, in this list of support units, we have the interaction with the print shop. Since we are the single largest user of the print facilities on the whole campus, and will have a volume of more than one-half million sheets of paper this year, there are significant scheduling problems. A thorough discussion of bookkeeping procedures and routing and scheduling problems have to be worked out with the print shop well in advance.

7. *Administration*

Our administrative structure includes the Dean, andAssistant Dean, a bookkeeper, an Administrative Assistant to the Dean, a full-time associate hired with Grant funds, and a secretary. In addition to the operation of the College, there's a good deal of interaction with the rest of the cluster through committee structures of one sort or another. Budget control is in the hands of the Assistant Dean with the advice and approval of the Dean.

8. *Support Staff*

You need to consider faculty secretaries, clerks, student tutors, and laboratory technicans among the personnel necessary for the operation.

9. *Facilities*

Somethought should be given to the specialized facilities needed for running a self-paced program. In addition to faculty offices, there has to be laboratory space, provisions for audio-visual viewing, a testing area, and, in our case, a common room where seminars, discussions, and coffee sessions can be held.

I have given you a rough sketch of the new building which we have designed to house College IV. I will send you a more detailed floor plan.

Our basic idea is to have all of the faculty offices surrounding a central, large room. In that large room, we have

a small, glassed-in laboratory where all work with volatile chemicals takes place. There is then a series of laboratory benches outside of that area where students can work with things which are neither volatile nor dangerous.

The rest of the room is given over to tables, chairs, lounges, and a large glassed-in testing center with tablet-armed chairs.

Each faculty office looks out on to this open room. Thus, the faculty can, while working in their rooms, look through their office window and see their students writing in the testing area or working inthe laboratory area. It is designed to accomodate thousands of students in much the same way that one does in a supermarket. Traffic flow is an important consideration. For the facilities, we plan that each laboratory station should serve approximately 10 students.

10. *Module Integrity*

Thought must be given to the production and creation of learning modules and the associated lead-time necessary. Validation of those modules is another area where consideration must be given. Student feedback is important on the modules and you have as a model the module evaluation form which was developed for us by our evaluation team.

11. *Evaluation*

If possible, you should make use of an outside independent evaluation team, to help you with both formative education through feedback and with a summative report at the end of the Grant period. The team that we are using is one which has been recognized by the Fund for the Improvement of Post-Secondary Education as a highly creditable group. They call themselves "F.E.R.A., FORMATIVE EVAULATION RESEARCH ASSOCIATES." The Director of the group is Mr. Richard B. Heydinger. He may be contacted by writing the Center for the Study of Higher Education, University of Michigan, Ann Arbor, Michigan. He wrote the evaluation proposal for the College IV Grants, and has directed the team that is carrying out that evaluation.

In the microfiche cards, which I am sending you, you will have a complete set of the reports from F.E.R.A. as well as a copy of the original evaluation proposal. When discussing evaluation with the team, you must consider both the confidentiality of information which they will collect and their degree of obtrusiveness upon the faculty and the students.

Reports in the National Literature indicate that today's students are sick of being tested and probed. We are very conscious of this and have had students rebell at completing the number of questionnaires and forms that we have provided

them through the evaluation team. Therefore, you should be very careful and very sparing in your interaction with students.

If you can collect a good deal of the data necessary for evaluation as a part of your normal operating process without having to go to them specifically for evaluation information, this will be helpful.

We have found that, given the opportunity to turn in evaluation materials voluntarily, most students will opt not to do so. Our initial return on module evaluation forms was only 10%. We have now had to put on constraints to assure a greater return of these forms.

12. *Outside Advisory Board*

If it is possible, you should consider having a three-to five-person outside advisory board. This board should be used to give you focus and direction for your program. The board should be willing to help you in maintaining a broader perspective for your program.

I would recommend that one person on the board be chosen from your local setting and that, preferrably, this person be a leader in industry or commerce. A second person for the board ought to be someone with some national stature. Other members of the board should be chosen because of the perspective which they would bring to the board and for the use that they might be to you in disseminating your idea and adding credibility to your enterprise.

We have a six-member board which meets twice a year. We pay all of their expenses, and give them $100 a day as an honorarium. You should recognize that the persons being chosen for your board can undoubtedly command far more than $100 per day, and so they do the work either as a labor-of-love for the college or because they are dedicated to the type of program which you are starting. Do not feel that you are doing them a favor by asking them to be a part of your board.

The board can either be used simply for window dressing, meeting once or twice a year, or you can carry on an active correspondence with board members between meetings. We have found that sending progress reports and other information to board members has been useful to them and to us. We do have limited interaction with them between board meetings but it is usually pointed toward an area where they can be of significant help to us. You cannot over-use your board members between meetings because they are busy people and you are not adequately reimbursing them for their work.

13. *Budget*

This has to be the last consideration because it is the most important consideration. You need to estimate both your start-

up costs and your steady-state costs. You will need to estimate those funds which can and should come from the general fund and those which should be gotten from external sources.

Wherever possible, external funding should be used for start-up costs, but with a clear commitment from the central administration that those costs will be borne by the institution following the expiration of the Grant.

In my own institution, I have negotiated with the central administration such that they will return to me 50% of any overhead generated on grants which I write. In that way, this 50% of the overhead becomes venture capital for me to use in the preparation of new grant proposals.

With a new program such as yours and mine, the administration has to recognize that it will take anywhere from three to five years before the program reaches what I would term a steady state. As you consider cost-effectiveness, you should be willing to amortize the start-up costs over a period of at least five years before expecting to have significant cost savings.

Be sure that you include replacement costs for hardware and software. You know, only too well, the high cost of software these days and the relatively quick obsolescence of such materials.

The last piece of advice for the planning year is to document everything you do. Have diary notes of all conversations with support units; have memoranda sent to each group where there is an expectation of some service to be delivered; and keep a chronological correspondence log. These documents will be extremely important to you during the implementation year to back up agreements which you had which are not being fulfilled. Be sure that copies of all these diary notes, memoranda and articles of agreement are submitted right after the meeting to all individuals involved. If there are problems this is the time to clear them up.

If you have a system of routing slips, you might even route a copy to the other parties and ask for their initials on it to be returned to you for your files. In this way, you can tell later than they had agreed with the procedure. This may sound terribly legalistic, but I have found that it is extremely important. People have very short memories, especially when you are asking them to perform a new or different service.

IX IMPLEMENTATION YEAR

A. Q. *Please list the major activities and events that must be accomplished during the implementation year; i.e., field testing, evaluation, admissions, etc.*

A. During the implementation year, by definition, one puts into operation all the plans which have been laid the previous year; therefore, I will not list all of those items again because you can refer to the previous discussion. Instead, I would like to speak about some general problem areas and some do's and don'ts.

As Director of the program, remain calm throughout the year. Everyone's going to be looking to you whenever something goes wrong to see how you react. If you panic, they will panic. At the same time, be alert to all sorts of problems. You should be ready to make small changes very quickly. You should resist any basic design changes. The flaws in the design should have been worked out during the planning year. Although there will be problems, and people will want you to change the basic design, you should definitely resist that unless it can be shown unequivocally that there has been a false premise introduced in the design.

There will be many impositions on the faculty time during the implementation year. There will be consultants, visitors, skeptics, friends, all coming to see the program.

There will be a lot of handholding done. The anxieties which all of us feel on our job are magnified everytime the program is new and different. Be prepared to spend a lot of time consoling your faculty.

One of the things you must do is to protect your faculty from the pressure of faculty not associated with the program. The world is full of skeptics. If there is anyway in which your program might appear to be a threat to others, then they will find a way to bring pressure on your faculty. Assume that everyone not connected with the project is looking for ways to define it as a failure.

Two important principles to remember are the Hawthorne effect and faculty burnout. During the first year, students and faculty alike will be putting great emphasis on their work and the Hawthorne effect will be significantly influencing the outcomes. By the end of the first year, the faculty will be tired and subject to faculty burnout. You must help them to maintain a balance in their professional life so that they do not become so totally involved in this that they want to leave it after one year.

As a general rule, you might as well expect to have to replow all the ground which you plowed the year before with the service units. Thus, all those diary notes and memoranda and articles of agreement which you wrote the year before will have to be trotted out, dusted off, and waved in the face of the unit.

The only way to minimize this is to maximize the degree of planning during the planning year. Even with perfect planning, however, you cannot eliminate difficulties with the service units. You are asking them to do extra work, new work to accomodate new procedures, and that makes them uncomfortable. Each person in that role already feels that they are working as much as they can and cannot take on any extra. If you stand fast on your previous agreements and develop credibility, they will come to know that there is no recourse but to serve you as they are supposed to do.

You might as well accept, at the beginning, that you have underbudgeted your project. There will always be a need for more money than you have been able to scrape together. Be ready to set priorities and to make shifts as need be. Furthermore, you probably have designed too much work to be performed in the time available. Keep a contingency plan in your desk to be trotted out when the work load gets unbearable.

X BOOKSTORE

A. Q. *What involvement does the bookstore have in the selling of software to students?*

A. This was covered before. All modules are sold at the bookstore to any student. Textbooks and reprints are also sold there. Slides, films, etc., are not available in the bookstore, although blank cassette tapes are available for sale.

B. Q. *How are prices determined?*

A. We analyzed the typing cost for the first 75 modules. We also took under consideration the amount of graphics and the amount of money necessary to produce those graphics. The average number of pages per each module was also determined for this group, and all of these costs then were divided among the 75 modules to reach an average cost per page. To this was added the printing, collating, and stapling costs for a print run of 200 modules for each title.

Incidentally, this size print run was settled upon by the faculty. It would have been far more economical to increase the print run but the faculty were afraid that they would have too little chance to revise the modules if that were the case. Therefore, the students are having to pay the development costs over a smaller number of modules..

To this is added 13¢ per module for validation and obsolescence costs. Thus, when a faculty member finds that a module is absolutely ineffective, he can pull that module from the bookstore and will destroy the copies. The 13¢ per module sold is to cover that loss.

To all of these costs, the bookstore has a standard 20% markup commission. That is actually 25% of the wholesale price added to the module to give what they call in retailing a 20% markup. That means 20% of the selling price is the markup.

C. Q. *Does the creator of the module receive royalties?*

A. Since all the modules to date have been produced with government funds or with college funds, the module creator does not receive a royalty. Part of his or her salary is to cover those materials. The materials are copyrighted in the name of the author and the college. There is no royalty structure built into the modules at this time since they are sold to the students at cost.

We have a publication policy which states that if the faculty member wishes to revise a module sufficiently to call it a new edition, that he or she is free to make such revisions on their own time and to go to a publisher on their own. In such cases, a contract between the author and the publisher would result in

all the royalties being given to the author. We encourage the faculty, however, to make use of all of our services, including secretarial, graphics, media, etc. In such cases, the college and the author will join in forming a contract with the proposed publisher. In this case, the royalty will be shared by the college and the author in proportion to the amount of effort put in by the college in the production of the new edition.

We are examining the possibility of finding one publisher who would be interested in taking over our entire curriculum and serving as the official publisher of all of our materials. I do not know at this time whether or not this might come to fruition.

We are using, however, commercially produced materials. Obviously, the student pays the full price with the royalties going to the authors and the publisher. We do not want to be in the publication business but are forced to be by circumstances.

XI EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel and other components?*

A. A part of our grant proposal included both formative and summative evaluation of the College IV experiment. We have a group of four graduate students from the University of Michigan who devoted a good deal of effort to the evaluation. A copy of their proposal and all of their reports is included in the microfiche which will be sent to you.

XII COSTS -- BUDGET

A. Q. *What is the ball-park figure for establishing a multi-media production lab -- keeping in mind personnel, equipment, supplies, and student workers needed?*

A. I have sketched out the major items of equipment, supplies, and personnal for the establishment of a multi-media production lab. I have also appended estimated costs. These are figures pulled from my head from my recollection of monies spent this year. They may have some error associated and certainly should be checked.

In addition to the student assistants who are paid for working, we have an arrangement whereby students who are majoring in our Arts and Media Program can do internships in the audio-visual production area. In this way, they earn college credit for their work and we do not have to pay them.

B. Q. *What is the cost of producing a set of learning modules composed of script, workbooks, taped lectures, film slides, and/or film strips, covering approximately 45 to 50 hours of instruction?*

A. Most of our modules are produced in lots of 200. At the present time, the production cost for each module with a print run of 200 averages $600. This includes typing, graphics, printing, stapling, and collating costs. It does not include faculty time.

We have estimated that to produce a module from scratch requires an average of 200 hours of faculty time. To produce a study guide keyed to a textbook requires an average of 25 hours of faculty time. Considering the average faculty salary at Grand Valley including all fringe benefits, we arrive at an approximate cost of $10 per faculty hour of preparation time. Therefore, a study guide for a one-half credit module would cost $250 for faculty time, whereas the same module created from scratch would cost $2,000. Most of our modules are one-half credit, and therefore 10 modules are required to be one five-credit course. For a five-credit course, therefore, the average production cost would be $6,000. For a study guide, the faculty cost would be $2,500 bringing the total cost to $8,500. For a fully developed module, the faculty cost would be $20,000, bringing the total cost for the course to $26,000.

For comparison, our five-credit course on a term system is equivalent to 3.3 credit course in your semester system. If you make extensive use of vidio-tape and film, your production cost is likely to go above our $6,000 figure.

C. Q. *How many hours of production effort are required to produce one hour of multi-media learning?*

A. For the faculty effort and the typing and graphics, this was answered already. I do not have data on the cost of the A-V staff for producing one hour of multi-media instruction.

The Audio-Visual Center at Grand Valley has established some basic rates for its staff and their involvement in productions such as these. My recollection is that the media person, who would be running the camera and directing the show, charges approximately $10 per hour for his time.

From a film-maker friend of mine, I have an estimate of three hours of production time for each hour of finished product in our kind of setting. For more professional settings, of course, that ratio is much higher.

For graphics and photo-services, Grand Valley uses a figure of $7 per hour. In addition, there would be the cost of materials used in the production such as the U-Matic Cassettes which are $30 for a 30-minute cassette.

D. Q. *How does the cost-effectiveness ratio of your system compare with the cost-effectiveness ratio in lock-step systems?*

A. As I mentioned in conversation with Dr. Shaw, cost-effectiveness has to be related to a variety of factors. There probably should not be any saving in faculty costs in a self-paced system. There will definitely be a saving on terms of equipment and facilities needed.

At Kansas State and Purdue, experience has shown that 10 students can use a single laboratory station, in a self-paced system. This means a tremendous savings in facilities and in equipment, such as tape recorders, microscopes, etc.

Another side is the cost-effectiveness for the student. If the student is able to arrange his or her study schedule to fit the work schedule, this has a real cost benefit for the student. Thus, if they are able to maintain their regular job and come to the campus at differing times, they will be benefited. This should definitely be a part of your calculation even though it is hard to put a dollar value on it. Access to students who otherwise could not make it at all must be considered, too, as part of the cost benefit.

Once the self-paced materials are written and tested, they can be taught and tested by lower-priced para-professionals. In this way, one can use a small staff of high-paid professionals to maintain the quality of the program, while directing the work of lower-priced para-professionals doing the bulk of tutoring and testing.

A quick estimate of our own facilities in College IV indicated that we were using only 60% of the academic space per student that was consumed by the College of Arts and Sciences. For an expanding college, this is a significant factor in space utilization.

CAMDEN COUNTY COLLEGE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. KIM PORTER

On Individualized Instruction

September 15 - 17, 1974

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Post-Secondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implemention across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campus to advise Professor Mario Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Dr. Kim Porter, who visited the College in the role of a consultant on September 15, 1974.

Dr. Porter is a Director of Life Lab, Miami-Dade Community College.

Life Lab is formed under the premise that all of life experiences can be learning experiences. Life Lab represents the free-school concept of individualized instruction, totally unstructured and aspiration managed

(aspiration management is the concept whereby students, upon entering college, are given a two-hour interview in which their goals are mapped out and in which their instructional objectives are formulated to match individual goals. In other words, each student has a tailored-made curriculum containing instructional goals, media sources which reach toward these objectives, and individual contracts restricting students to time, quality, and quantity of materials.) Life Lab represents a wide-open concept of individualized instruction whereby student achievement is rarely measured formerly, where students develop their own courses of study, and where frequent meetings with mentors determine the progress of the students.

The student is classified as graduated when his mentor is satisfied that the student has reached the educational objectives of his curriculum.

Life Lab deals with the first two years of college only. The registration is open to anyone 18 years old or older. Completion of "courses" are restricted to the semester time slots.

The Life Lab, a self-directed, open-learning program at Miami-Dade, is expanding its capacity to serve learners through the addition of a competency-based curriculum and a computer mediated management system. The curriculum development component will expand the definitions and offerings in which learners can demonstrate their achievement. The computer application will be both in keeping the individualized records of the progress of learners, and in diagnosing areas of deficiency.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least 8 - 10 consultants.

The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report, that will be presented to H.E.W. in June of 1975.

INTRODUCTORY REMARKS

"Life Lab" is an interdisciplinary program based at Miami-Dade Community College, downtown campus, in which students can contract to do self-directed studies rather than take regular classroom courses. It is similar to the National University Without Walls Program. It is experientially oriented and centers on two or three aspects of which I will give a brief summary.

"Life Lab" centers around a thought of learning experiences. We are believers in the fact that learning without experience or experience without learning has little value. So, therefore, if one is able to translate his daily experience into learning, then we feel that one should be able to get credit for it.

"Life Lab" is interdisciplined. That is to say, a cluster of courses that a student might contract for will be considered as a whole rather than separate subjects. The relationship between students' curricula and their own life and long-range goals, we feel, has a lot of merit. Therefore, things like reading, tapes, projects, seminars, all relate in one way or another to several courses in a study contract.

"Life Lab" is self-directed. We feel that self-directed studies in which students can plan learning activities -- in a way that will fit

their interest and their time schedule -- that usually include listening to tapes, reading, going on field trips, watching T-V documentaries, attending certain seminars, participating in workshops, undertaking special projects, and volunteering for community work.

I ADMISSIONS

A. Q. *How does a student apply for admissions to your school?*

A. The application for admissions to the Life Lab is the same applications for admission to Miami-Dade Community College. There's no difference in admissions.

B. Q. *What are the admissions requirements?*

A. It's an open college -- no high school diploma is needed -- 18 and over is the only admission requirement.

C. Q. *What are the record-keeping forms and procedures used in the admission sub-system?*

A. We do not have an admission sub-system. Every Life Lab student has to go to admissions like they would to any admission desk in any college.

D. Q. *When the student leaves the admission sub-system, what proof does he carry with him that he has been admitted to your school?*

A. The only answer to that is it is an open college, and that they would have a receipt for the $5 that they had to pay to be admitted and get a student number, which is basically what the $5 is for.

II REGISTRATION

A. Q. *Where does the student get advice about scheduling, curriculum, and courses?*

A. The answer to that is that after the student is admitted and has a student number, they come up to make application for Life Lab. And, the way you make application for Life Lab is you walk into a big area in which there is a programmer on duty, and two or three things have to occur:

1. You need to talk individually with somebody about the philosophy of Life Lab;
2. You need to see an audio-visual tape that has been made by the students at Life Lab.
3. You need to bring with you transcripts of any other curriculum you might have had at other colleges; and sit down with an individual or counselor to make sure that you are taking the right courses; and
4. You need to read the Fact-Pack, which will be lettered #1 in the forms that I will leave with you and which is self-explanatory.

The Fact-Pack tells about the process of entering Life Lab, the concepts about it, some of our beliefs, some of our questions, and, in the back, it talks about the grading policy as well as the curriculum planning document.

If one makes the decision to stay in Life Lab, or to enter Life Lab, then he or she will be given a programmer. That programmer will sit down with him for a minimum of an hour -- hopefully at least 90 minutes to two hours -- talking about each other, making sure that there is a good relationship, and then talking about the scheduling, curriculum, and courses they will take. At this point, he or she will be registered into an orientation.

An orientation involves two specific things:

1. On-going weekly group meeting of new students and old ones that are interested in sitting down and chewing the fat about what they are learning and what Life Lab is about and philosophizing.

2. Secondly, joining in on orientation for new students in which you are given a walk-through tour of what the philosophy and merits behind Life Lab are and the benefits that you can have there. What we have hopefully tried to do is get the philosophy and the thought about Life Lab into the student before we ever register them.

B. Q. *How does the registrar know that the student has been authorized to enter classes for which he is registering?*

A. As long as a person has a student number, we are willing to register them. We don't need to know any more than that. That means that they have been through admissions. Since we don't have any closed classes or course cards, we don't need to know whether a student is registered or not. They are registered only when they pay and we handle all the payments and registration in our own office. We are sort of a sub-system to the registrar's office.

C. Q. *What are the forms and the record-keeping procedures involved in the registration sub-system?*

A. Form #2 is called the Life Lab Mail-In or Hand-In Registration Form. It is self-explanatory. After student, programmer, and coordinator each look it over and sign it, then that is the receipt for the money that they turn in with it.

D. Q. *What proof does the student have, upon leaving the registration sub-system, that he has been: 1. admitted to school; and 2. gone through the registration system?*

A. The answer to both questions is that he has a copy of his admissi form. After this has occured, though, he or she will receive a receipt for the check that they have turned in by our own sub-system registrar, or the receipt will be mailed.

E. Q. *Can a student register at anytime during the year?*

A. The answer is "yes" and "no." It's "yes" on the basis that we always are continuing to have orientation classes; but, usually, orientation classes are run for only four weeks and you just abou have to register anywhere from three to four months early to get into that orientation class. The reason for that is that we're just swamped. People are coming from out of the woodwork to get into Life Lab, and we don't want to take them in and just give them a number and process them. So, we are only registering 30 in an orientation at a time, and it makes it very difficult. At this point in the Fall of 1974, we happen to be running five orientations with 30 in a group, and we are really taking in 200 students instead of the 150 that we anticipated.

F. Q. *Is there a minimum and maximum number of courses for which a student may register?*

A. Yes, this is one of the "system" answers to making sure that we stay in line. We have a minimum of three courses -- and a maximum of five courses -- three credit hours each on a semester system.

III BURSAR

A. Q. *How does the bursar know that the student who is attempting to pay for courses has been fully admitted and registered?*

A. The only answer I can give to that would be that the bursar really doesn't need to know whether they have been admitted or registered because it's an open college.

B. Q. *What forms are involved?*

A. The same form that I showed you previously -- dealing with registration. I believe it's form #2.

C. Q. *What is the tuition amount charged for each course or module?*

A. Each course costs $37.50, that's a three hour course; or basically it costs $12.50 per semester hour. The maximum is $125 per term -- that is for four or five courses. This year, the state has added $4.50 for some fee -- I'm not sure what it's called. So, a maximum load of four or five courses would cost $129.50 -- and for three courses it would cost $112.50, I believe.

D. Q. *What form (or proof) does the student have that he has paid for a specific module?*

A. He has a receipt and a copy of the courses that he or she is taking.

IV FACULTY

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. There are no classes at Life Lab. There are open seminars. The only proof they can give you is their log. Yes, log -- like a captain on a ship. All of them log their learning experiences; and that will be form #3. Form #3 needs an explanation because it is a pack, or a packet of some 26 or 27 pages which every student is given. It's called a Life Lab Form for a one-semester study contract.

In this packet is a set of summary, log-report forms which I just talked about. This is where the students log all of their learning experiences. Also, in this packet are Life Lab tapes and 2,000 series reprints, sponsored group activities, audio-visual media, group learning activities, reading, and other learning activities.

Also in this packet are 10 book report forms and interest journal forms and a "How to Keep a Personal Journal and Personal Interest Journal Form." It might be noted that all these forms are flexible. We have examples, only, of forms in here. We have two or three types of book report forms and sample tape-response forms; but we have just placed one sample in each packet.

Also, we have a reprint room that contains some three to four hundred reprints that either teachers, professors, students, or what have you, have recommended where they've done reading. We write off and say, "Hey, can we borrow it or make a copy of it so the students can have it?"

So, getting back to the question as to whether or not one can prove he belongs there, it all centers around the fact that one proves he or she belongs there by what one logs and by their experience log forms.

B. Q. *What sort of orientation does the mentor give the entering student?*

A. I think I explained that on the question about registration. It basically takes probably four to six weeks to get through orientation with us; then, of course, they are registered. That's their choice. They join a group -- you know, the sit-in-and-feel-it-out type of group. There are new student groups and then there are orientation groups which a coordinator and programmer run together.

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, the completion of modules, and the issuance of the next sequential module?*

A. We have no testing in Life Lab. We only do what we call "updates" There are required a minimum of four to six updates per term. Hopefully, a student and a programmer will get together more than that, but there's a minimum of four to six updates. At an update they go over their Life Lab study contract, which will be sample form #4.

At each update, one is able to look over the contract that he or she has created. This is the type of contract suggested. One can negotiate. The student can negotiate with the programmer to change any part of this contract. That's perfectly alright, as long as they can find something that is equal or that can justify the same learning experience. So, therefore, what testin occurs is that you would sit with a student and you would talk about what their learning experience has been and why they've learned it. Hopefully, in some type of sociological or physiological way, you will be able to recommend some very positive things to the student as well as, of course, the student helping the programmer to learn too, as we all continue to learn.

D. Q. *What are the forms involved in this sub-system?*

A. I think I'll just have to say whatever forms are involved will be enclosed. I, hopefully, will cover each one of them; and, if I do not cover them through the questions that you are asking here, I will at the end.

E. Q. *What communication system is installed to inform other sub-syste i.e., registrar, computer, administration, etc., of the progress of each student through the overall system?*

A. We have our own registrar. So, that is a sub-system in itself, and we've found this to be the best. I might say the philosophy behind this deals with the fact that I don't know any school today that registers students in a very humane way. So, therefore, we have tried to make it as humane as possible, which means brief, quick, to the point, so that they can get on with the learning process.

F. Q. *What number of weekly hours are spent with students by the average faculty member?*

A. As I've said before, we do updates, which can be weekly, bi-monthly, or monthly. The requirement is between four and six per term. They last a minimum of two hours each. As I see it though, philosophically, most programmers see their students at least weekly and some just every two weeks -- many times in a group update as well as many times individually. But, of course, students are coming in and out all the time in seminars.

G. Q. *What is the student-teacher load?*

A. This is difficult to say. The maximum load for any programmer, which is our equivalent to a teacher, is 36 FTEs, which is usually 32 - 45 students. The minimum load can be one student or a part of an FTE. We have about 6 or 8, maybe as many as 10 now, what we call full-time programmers; that is, their whole job is right there. That's their full-time job. And, if they're para-professional, they make around $8500 to $9000 a year. If they are faculty, they make from $12,300 on up. That's our minimum faculty position. We have one young lady, who is a secretary, who works with half a dozen students at night. We have another one, another young lady, who is a youth counselor for the division of youth services for the state of Florida. She leads seminars and also picks up a half a dozen students or so. We have a banker, we have a young attorney who likes this type of education, and all these people work with two, three, maybe up to 15 students.

Anyone new coming in the system cannot work with more than five students. If they have a full-time job, they can't work with more than 15 students; but, if they want to go full-time, they can create their own student-load. If 40 students wanted John Doe to be their programmer, he can quit his job and work with us full-time.

The minimum requirements for credientals is an A.A. Degree. Of course, there are opportunities for them to be taken on as a full-time faculty member, and the higher they go, the better the pay.

H. Q. *Are there any special pay considerations involved?*

A. Yes. For instance, one young lady with a Master's Degree in the area of Geology has a light load, like ten students; but, we pay her for 20 or maybe 25 students because she sets up weekly field trips. Every Monday, she has a field trip to some area of interest in the South Florida area, either dealing with Indians or rock formations or coral or something of this nature — — different things in which you can get involved. She has the responsibility for that.

We also are able to pay people (outsiders) who come in to lead seminars. Now, if a person like myself leads a seminar, I don't get extra pay because that's part of becoming a part of Life Lab. But, if you come in from the outside, like we bring Mario in from Camden County College to lead a seminar, then we would pay him a minimum fee, which is basic to any fee that would be paid on a college level.

Also, we have some extra groups -- what we call outreach, on-going groups -- that are kinda classified outreach because they can't come to Life Lab. People like Indians on a reservation or prisoners in a jail, or stockade, or drug addicts.

This past year, I was involved with all three of these. In fact, I was in charge of the outreach groups. We have 20 people in

the stockade, about 20 or 30 in the jail, about 20 Indians, and something like 30 or 40 ex-drug addicts. It is very difficult for them to come into the university; so, we go out to them and run seminars for them. Whoever does that gets extra special consideration.

I. Q. *How is a professor's roll changed as compared to those who are engaged in the lock-step system?*

A. Well, I think the basic answer to that is that they're not professors. They're not teachers. They carry the role of an "enabler." I consider myself a professional enabler, a programmer-advisor. I am one who enables people to learn, and that means, basically, I have to continually know where people can gain such learning; therefore, we are in constant search for learning experiences for students.

Most seminars that are led are, basically, dialogically oriented. They are not monologically oriented. They are experiential seminars.

Some, of course, have the presentation and the response; but, basically, it is a dialogue type of thing. It is seminar oriented. It's workshop oriented. It's lab oriented. So, therefore, a professor's role could be different; but, of course, if you have a creative professor, this wouldn't be anything new to him or her.

V LEARNING RESOURCE CENTER

We feel that life is our learning resource center. We have some sub-systems like a multi-skills lab, a biology self-directed lab, and a math self-directed lab. Therefore, to say that we have a learning resource center, specifically, I would have to say "NO." We have all the availability of everything in the audio-visual department as well as in all the different labs on the campus. We also have a list of learning resources for all students and that is available for them to plug into throughout the whole city and county.

A. Q. *What is the system for checking out and returning learning modules from the library?*

A. What learning modules a student might desire to get from a library would be similar to any student in a traditional class. Since we don't have modules, a student creates his own module; and, therefore, has to go through whatever red tape there is to get the learning from such an experience.

B. Q. *Do you have study carrels equipped to handle AV equipment?*

A. Yes. We have carrels on the sixth floor, which is where Life Lab is; and we have carrels throughout. There's no hang-up or problem at all as far as that's concerned. Plenty of equipment for students' use. We do require that every student buy a cassette recorder. This is the only thing we require them to buy.

C. Q. *Is a record of time spent at carrels kept by the learning resource center?*

A. I believe I explained that on the summary logs prior to this.

D. Q. *How do the LRC personnel know that a student is authorized to check-out a certain learning module?*

A. Basically, if a student went to the biology lab or the math lab, or the multi-skills lab, they could get a form from us saying these are the things they are in need of. That form and their student card would authorize this action.

E. Q. *Are special personnel required for the LRC and the module production lab?*

A. Not personnel from Life Lab. These are regular teachers or regular people hired by the school. We use all resources of the school. We hire no one for specific tasks such as audio-visuals or multi-skills or biology or math. These are regular people hired by the school to be used in that area.

VI MISCELLANEOUS

A. Q. *If a student is to perform the activities comprising a learning module away from the campus, how are the hardware requirements monitored?*

A. As I stated before, I think this is under form #4, Life Lab Study Contract. Basically, at each update, this is taken care of. It's worked out with the programmer because we feel that almost every bit of our learning experience is away from the campus. They come to the campus to get specialized learning experiences.

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. Well, it's an open college; and so, I guess a person could enter Miami-Dade Community College and not even know how to read. But, we usually find this out rather quickly, and we channel them immediately into the multi-skills lab and into english areas and literature areas that would help them get off the ground. A real desire to learn is their only prerequisite to Life Lab.

C. Q. *How are the educationally disadvantaged, minority students, and "fast" students provided for in your system?*

A. First, students work at their own pace, which means that if you are disadvantaged and slow then maybe you'll get an incomplete. We don't have any failures, just incompletes. "Incomplete" becomes a "failure" if it's transferred, but "incomplete" gives the students a little more time to complete their work. They have a period of a certain length of time, like a semester, to do it, following that incomplete.

If a student is fast, he or she can complete early and then help us develop future plans.

Also, "fast completes" can become programmer-advisors if we see that they are good. We help them develop their abilities.

Maybe I should explain here that all contracts are "B" contracts. To do an "A" contract, one has to do something extra special. So, therefore, a slow student might just get all "B"s. It doesn't mean that they are not an "A" student, it just means that they have not done an extra project.

But, on the other hand, we have students who can fulfill a project, and so they develop a project of excellence or special project. If they complete that, they get an "A". This is how we handle the fast students.

We do have one drawback here, though. One can only get 50% "A"s. If they contract for four courses, only two can be "A"s.

D. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. We have no promotional methods whatsoever. If we promoted, we'd be swamped. So, therefore, we do not promote; in fact, we underpromote, if such a thing can be done. We try our best to glean out those we do not feel can be self-directed, or are personally motivated.

E. Q. *Do you require your producers of learning modules to demonstrate competence in their area before employing them in your system?*

A. The answer to that, Mario, is "yes" and "no." The only learning modules that we have are explained in the forms I mentioned. There are some "example" study modules that we have created for some basic courses. I will list these as Life Lab, Course Guides. They will be example form #5.

This is the closest thing that we have in Life Lab as a learning module. We don't even have one of these for every course although they are in the working process. You can see in these course guides that we give goals, key questions, key concepts, possible cultural scenes for field work, tapes relating to the courses, recommended books, and further explorations. I think, on each one of these, you will find such statements as I've just made. This is the closest thing we have to learning modules to demonstrate a competence. That is really not to demonstrate as much as it is a course guide to give one direction towards such competence.

F. Q. *Do you have an educational technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

A. I don't know how to answer that. I guess the answer would be "no." We ask people to come in and feel Life Lab, to learn what Life Lab is to them. Maybe get a student or two and start

interning. We have people interning all the time with us, just sitting in on updates and trying to come to grips with what's happening; then if they want to get in the program, they can. This is strickly on their own. It's not something that we push. We don't go out looking for people.

VII EXTRA COLLEGE ASSISTANCE

A. Q. *To what extent are off-the-shelf learning modules, commercially produced, used in this system?*

A. Basically, I would say none, but they could be. In other words, there could be students right now using them that I'm not aware of. If they fit what the student needs to learn and wants to learn, then we allow that student to use them. For instance, we have students auditing courses that they are taking in Life Lab, but they don't want to sit a test that has little or no meaning to them;and they also don't want to be able to do other learning experiences outside of that classroom.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

Quite a bit. We involve prople. We try to get the best person for the best seminar. We've involved people constantly in producing study plans and course guides that I mentioned previously. We get the best possible people for seminars to come in, and we are very lucky there because we have a talented group of 30 people right now on the staff. They have contacts; and usually, we are able to get people cheaper, if not free.

VIII PLANNING YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year; i.e., production of learning packages, developing of systems, etc.*

A. I'll have to say that it's done internally and externally. When we plan the year, every student, every programmer, every coordinator has one equal vote. If students want to get together and decide to change the contract, we do this. We have open faculty meetings. We meet right out in the middle of a big large area. All students can attend.

We have open coordinator meetings. We offer what we call the "Open Chair Setting." If you've got something to offer, you come up and sit in that chair. After you've done your thing, you leave the chair. It's a very valid way, we feel, because whether we like it or not, we have to listen. We can't just sit around -- we have to listen. Therefore, internally, we are organically produced.

Externally, we are produced also organically; our major activities and events are produced because we have the outside. We have the student coming in externally as well as internally. We feel it's an external/internal production, and we have people coming in and helping us see that we are doing things right or wrong. We bring them in to test out what you might call a module or test out our learning experiences or test out whether or not we are cricket. And, of course, we also have the big system looking at us all the time.

IX IMPLEMENTATION YEAR

A. Q. *Please list the major activities and events that must be accomplished during the implementation year; i.e., field testing, evaluation, admissions, etc.*

A. The only way I know how to answer that is to say that, if a person goes through Life Lab and completes Life Lab, admissions, faculty, financial aid, or what have you, and goes through all of their updates and evaluation of their programmer and the program, then, in turn, we can say that these are the major activities and events. I will say that we have been evaluated by a lot of groups, and possibly this stuff is available to be sent to you. I'll make note of it and send it to you, if it is available.

X BOOKSTORE

A. Q. *What involvement does the bookstore have in the selling of software to the students?*

A. We basically give a list of books that we think are of interest. They are usually in general fields, but we also recognize that one of the requirements of every Life Lab student is to go down and check the bookstore. If they are taking Psychology 211, which might be dynamics of behavior course, then we ask them to go find out what other traditional teachers are recommending their students to read; for out of that one book or group of books, they can get a bibliography or an interest in the area or see what would be of interest to them to read. Also, they then come to grips with what it might mean to study in that course or to study in that area.

B. Q. *How are prices determined?*

A. By the bookstore.

C. Q. *Does the creator of the module receive royalties?*

A. Yes. Except that they wouldn't be called royalties. We give a basic fee for the first course guide, but nothing comes afterwards.

XI EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel and other components?*

A. This is probably one of the most potent positive things within Life Lab. We evaluate everything. We evaluate every meeting we have. We evaluate every seminar we have. We evaluate on the basis that the only way for us to really stay on top of everything is to evaluate. These evaluations range from a total page to maybe just one or two sentences. An evaluation for an update with a student and a programmer might be a list of numbers from one to five -- one being very valuable; five not being valuable at all. A student basically circles the number that they feel pertains to them, which tells little or nothing except for the fact that they might tell the programmer that something didn't happen right.

XII COSTS -- BUDGET

A. Q. *What is the ball-park figure for establishing a multi-media production lab -- keeping in mind personnel, equipment, supplies, and student workers needed?*

B. Q. *What is the cost of producing a set of learning modules composed of script, workbooks, taped lectures, film slides, and/or film strips, covering approximately 45 to 50 hours of instruction?*

C. Q. *How many hours of production effort are required to produce one hour of multi-media learning?*

D. Q. *How does the cost-effectiveness ratio of your system compare with the cost-effectiveness ratio in lock-step systems?*

Mario, I'll have to say that I really don't know how to answer this. Hopefully, I can send you something that will explain how we do what we do. Let me try to philosophically explain it, though.

We have no grant, we have no extra monies from any source. Every student we have produces a certain amount of money through an FTE and that's where all of our monies come from. In other words, if we had 30 students, we probably wouldn't have but one full-time programmer because that would produce maybe 30 FTEs. We pay our para-professionals, those who are not faculty, either $4 an hour, or $4.75 an hour only if they are willing to lead seminars, be a programmer on duty part of the time, and hang around Life Lab a little more than the normal. If they get paid $4, they're somebody who's just handling students. That's their only bag, and that's all they really want to get involved in.

The other people, like faculty people, get paid according to FTEs, which is about 450 more than we had a year ago, in the Fall of 1973.

So, the ball-park figure on the cost of producing a set of modules, or how many hours of production, or the cost-effectiveness ratio, I couldn't give you. I'm not even sure they are answerable because we can't hire anybody or can't utilize any monies except if we have students. When students quit coming, then we quit existing. We are there strickly as an answer to a need, and we are responding to that need.

XIII VOLUNTEERED INFORMATION

I thought it might be a good idea if I gave you some more information about Life Lab that might be of interest to you. I think most of what I can say will be on printed matter. So, I'll take them one at a time.

I've given you five basic forms listed 1 to 5; and I'll start with #6, that is called LIFE LAB INFORMATION SHEET. It says what it is, what are the studies, what are the programs, what you can take, and etc.

Form #7 covers courses that we offered in the Fall term, 1974, in Life Lab -- with sequence number courses, course titles, and credit hours.

Form #8 is another all-tape response form. It's just another example of some of the forms that we are utilizing.

Form #9 is a task-oriented, response form. It's purpose is to provide a technique to help group members of a task group identify each issue of great concern to them and to present a framework for dialogue about the issues.

Form #10 is a self-directed, learning lab response form which I think is also pretty much self-explanatory, except that one uses it when one needs to.

Form #11 is an all-tape list -- it is a complete listing of all the tapes with a tape index that gives you the table of contents of how to look for them. It also contains an alphabetical listing of the different tapes, with numbers that refer to the tape index.

Form #12 is a reprint list -- this is an old list. I could not find the new one when I left, but it gives you an example of what we have on file.

Form #13 is a book report form -- self-explanatory.

Form #14 -- suggests journal content.

Form #15 -- is a programmer check list. All the things that a programmer ought to do. It may be out of date at this point, but you can see where we've been, anyway.

Form #16 is a student conference description -- what should happen when students come together at a conference.

Form #17 is something that we're real proud of this year with our "be here now" type of thing -- which comes from Ron Doss and his journal concerning his journey to India. The idea behind it evolved into a whole list of morning and evening sessions on getting acquainted with faculty members and people of that nature leading seminars. It explains a little bit about each faculty member and the seminar they are leading.

These are all sampler seminars. It took us three to four weeks to put them on. Then, students buy into it; like, for instance, I'm leading a seminar on with Esther Cauliflower on Tuesday, September 3. We're doing one on human sexuality, dealing with the whole person, attitudes, relationships, personal values, etc.

People came to that seminar; They decided whether or not they wanted to buy into that seminar. If they did, we set up a 10-week seminar with them.

Form #18 is a packet of many reprints, I brought just an example of maybe about 20 of our 200 reprints of how we use them, how we number them, and what the value of them is to the student. Basically, they're available to all students. They are reprints of articles. Sometimes they are just cartoons. Sometines, they're the full reprints. Sometimes, they're things we xerox. Some of them are things that we've written. There's all kind of things dealing with education, philosophy, relation, phychology, sociology, and etc.

CAMDEN COUNTY COLLEGE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. LEE HARRISBERGER

On Individualized Instruction

October 1 - 2, 1974

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Post-Secondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campus to advise Professor Mario Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Dr. Lee Harrisberger, who visited the College in the role of a consultant on October 2, 1974.

Dr. Harrisberger is the Dean of Science and Engineering at the University of Texas, Permian Basin, Odessa, Texas.

UTPB is an upper-level engineering college dealing in the last two years of undergraduate studies and graduate work. The primary instructional mode is the individualized instruction system with a potpourri of the

various methods of individualized instruction; i.e., audio-tutorial, self-paced, lectures, authentic involvement, small group modes of instruction, large group modes of instruction, multi-media modules, programmed instruction, etc.

The system, because it deals with upper levels of higher education, utilizes the least-structured modes of individualized instruction and culminates a student's particulation in a course of authentic-involvement experience.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least 8 - 10 consultants. The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report that will be presented to H.E.W. in June of 1975.

INTRODUCTORY REMARKS

This is a response to the Camden County College NLSES Survey Questionnaire. The response is by Lee Harrisberger, Dean of Science and Engineering at the University of Texas, Permian Basin, Odessa, Texas.

The responses that follow are based primarily on the experiences that we have had in the development of the New University of Texas of the Permian Basin.

UTPB is a new upper-level university in the University of Texas system. It is chartered to offer the junior and senior years of the under-graduate programs in 27 degree areas, with authorization to offer graduate programs. We opened with five master degree programs and 27 undergraduate degree programs in September, 1973.

The basic design format for the university was based on an over-all emphasis on flexibility in the development of the various degree programs. A number of innovations were incorporated in the development of the academic programs and program stragedy. A heavy emphasis was placed on the incorporation of individualized instruction; and on opening day, 25% of the courses offered were self-paced.

In addition, each student is allowed to develop his own plan of study, in consultation with his advisor; and each plan of study must contain a minimum of three credit hours of experience learning.

There is a great deal of encouragement for the faculty to develop the course designs on a modular or competency-basis, instructional format with an emphasis on the use of media wherever expedient.

The university program incorporates a program which is supported by an integrated learning resources center that combines the services of the book library, media, instructional development, and computers.

The University contains three colleges -- the College of Management, the College of Arts and Education, and a College of Science and Engineering.

There are no departments. Each degree-granting discipline is headed by a chairman who serves as the academic coordinator for the faculty of that discipline.

Laboratories for the University are combined into one open, self-accessed laboratory system, supporting all disciplines who require laboratory work.

The Engineering Program in the University is the only program that is totally self-paced and continuous on a year-round basis, in the same format as College IV. The rest of the degree programs are combinations of self-paced instruction and conventional instruction.

The University opened with 1100 students and 60 faculty members and began its second year of operation this Fall with 80 faculty members and 1350 students.

UTPB is one of three new universities added to the 13-campus, University of Texas System -- served by one Board of Regients. The other two universities are the University of Texas in San Antonio, which will open in 1975 as a four-year institution with graduate programs, and the University

of Texas at Dallas, which opened last year as a guided institution and will begin upper-level, under-graduate degree programs in 1975.

In addition to these three new universities, Texas has also started six, upper-level colleges which will offer junior and senior studies toward a bachelor's degree, without any graduate program. These new upper-level institutions are designed to supplement the existing institutions in the state and draw heavily upon the 53 campus junior community college network in the state.

I have brought along a school catalog and a number of other printed materials and forms that are representative of some of the procedures and operational methods that we are incorporating in the development of this new University.

UTPB is instruction-oriented. All faculty will be rewarded on the basis of their instructional expertise. Thus, a great deal of emphasis is being placed on faculty evaluation and the evaluation of the teaching process.

Each faculty member was required to attend the University-sponsored, three-day workshop on the writing of behavioral objectives and the development of competency-based, individualized instruction.

A great deal of care was taken in selecting the initial faculty. We set very high standards. Every faculty member must have a terminal degree in his discipline from one of the top 25 graduate institutions in the United States. That's our faculty. Each were selected because of his/her strong interest in the development of innovations in the teaching process. About 20% of the faculty had had prior experience in the management of individualized learning.

I ADMISSIONS

A. Q. *How does a student apply for admissions to your school?*

A. A student may apply to UTPB directly to the registrar. A student can be admitted at any time and can enroll in the self-paced course at the time of admittance.

B. Q. *What are the admissions requirements?*

A. A student will be admitted to the undergraduate program if he has completed 60 credit hours of college-level instruction at an average grade of "C."

Admittance to the graduate program is based on having satisfactorily completed a bachelor's degree at another institution.

C. Q. *What are the record-keeping forms and procedures used in the admission sub-system?*

After the registrar has documented that he has satisfied the basic admissions requirements of the University and has received a transcript from the student, the student's records are sent directly to the college for assignment to an advisor. It is up to the faculty member in the discipline to determine the eligibility of the student to proceed in the degree program. The faculty member may determine that the student has insufficient background to enter the proposed degree program and suggests that he return to the local junior college to make up programs at lower-level deficiencies.

D. Q. *When the student leaves the admission sub-system, what proof does he carry with him that he has been admitted to your school?*

A. If a student has met admissions requirements in the registrar's office, he is given a registration packet, and proceeds to his assigned advisor. We will admit a student with as few as 54 hours provided that he will agree to co-enroll for the remaining six hours at one of the local junior colleges.

II REGISTRATION

A. Q. *Where does the student get advice about scheduling, curriculum, and courses?*

A. Each student is assigned a mentor who serves as the student's advisor and counselor for his entire period with the University. The mentor works with the students in developing a student's individualized plan of study and advises the student on the courses he should enroll in and the course sequence he should proceed to take. When the student and his advisor agree on a total degree plan, the plan is worked up on a form and signed by the student, the faculty member, and the Dean of the college. The entire registration and enrollment procedure operates on a conventional semester format to be compatible with the UT system. The advisor signs a registration card for each course the student enrolls in. Any student desiring to enroll in courses after the fall registration period must obtain a signature from the instructor of the self-paced course that he wishes to enter.

B. Q. *How does the Registrar know that the student has been authorized to enter classes for which he is registering?*

A. The registrar keeps track of all of this business using a computer program. There is a unique number established for each course and each section of each course. And, if the course has variable credit, as most of our courses do, there is a unique number for each unit of the course that has a different credit hour. There is a tentative maximum number of credit hours set at 20. However, with the Dean's permission, a student can be allowed to exceed 20 credit hours.

C. Q. *What are the forms and the record-keeping procedures involved in the registration sub-system?*

A. We have had to establish some special techniques for handling the continuous self-paced students. The record-keeping for the Univeristy conforms to the semester system.

D. Q. *What proof does the student have, upon leaving the registration sub-system, that he has been: 1. admitted to school; and 2. gone through the registration system?*

A. I have answered this question under the topic of "Admissions."

E. Q. *Can a student register at anytime during the year?*

A. The student may register any time during the semester in a self-paced course. If he does not complete the course by the end of the semester, he must re-enroll in the course for the second semester and receive a "Z" grade for the course. The "Z" grade is registered on his transcript as merely self-paced instruction in progress. When he re-enrolls in the course, the "Z" grade becomes a permanent grade but has no grade-point average content or does not figure into the hours attempted.

At the end of the second semester enrollment, the student, if he has not completed the self-paced course, will receive a "Q" grade. In those cases where the student wishes to register in a self-paced course very near the end of the semester -- where he would not have sufficient time to complete it -- rather than having him be penalized by paying two enrollment fees in a short period of time, we often unofficially register the student and allow him to proceed in the course;then he registers formally at the beginning of the next semester.

All of these procedures have evolved in order to protect the faculty member from a hidden overload. At the same time, we must protect the institution from an inordinate management load on the part of self-paced students.

For example, if a student is allowed to enroll in a self-paced course and taken unlimited amount of time, he is apt to eat up more management time than his tuition is really proportioned to allow. For this reason, it is necessary -- on open-ended self-paced programs -- to specify when the student must complete the course or face having to re-enroll and pay another tuition bite. This is why we say a student must re-enroll for the course if he has not completed it within a one semester block of time. The "Z" grade says that he can re-enroll without penalty and that he is merely in progress.

The re-enrollment tells the student that if he wants to take longer and use more of the instructor's time to accomplish the course, he should pay more fees to do it.

The ultimate motivation in this type of administration is to encourage both instructors and students to make the instruction efficient enough so that the student finishes in less than a semester's time. Our track record among successful self-paced instruction courses shows that the average student will indeed complete a 16-week equivalent course in less than 12 weeks with a grade level of "A" accomplishment. This is where the ultimate efficiency of the educational process will pay off in the management end of accountability for faculty time and tuition costs.

F. Q. *Is there a minimum and maximum number of couses for which a student may register?*

A. There is a tentative maximum number of credit hours set at 20. However, with the Dean's permission, a student can be allowed to exceed 20 credit hours.

III BURSAR

A. Q. *How does the Bursar know that the student who is attempting to pay for courses has been fully admitted and registered?*

A. (No answer was given to this question.)

B. Q. *What forms are involved?*

A. (No answer was given to this question.)

C. Q. *What is the tuition amount charged for each course or module?*

A. In the Texas system, the tuition costs for enrollment are $4 a credit hour with a $50 minimum tuition, regardless of the number of credit hours enrolled, up to 12. Therefore, it doesn't matter to the student whether he enrolls in four credit hours or 12 credit hours. It still costs $50. In any case, the tuition is ridiculously low. Nevertheless, in a self-paced management, the student should be allowed to enroll as he sees fit and to pay tuition on the basis of the module or course modules that he enrolls in, as they do in College IV.

D. Q. *What form (or proof) does the student have that he has paid for a specific module?*

A. Since we must conform to conventional management procedures in the Texas system, we incorporate the element in self-paced courses, using the same procedures that we do for conventional registration.

IV FACULTY

Introductory Remarks

This section of the report deals with, essentially, the concepts of the management of the learning process. I have assembled a file called "Faculty SPI Materials" from some of our faculty who are doing an excellent job of managing self-paced instruction and who submitted copies of the material they use to administer the program. You will see that the style varies considerably, and well it should.

I think one of the important aspects of a good learning-management system is that it allows the faculty member to be creative in developing administrative techniques that suit his own discipline and his own sense of organization; but, at the same time, they follow some of the fundamental concepts that are so necessary to assure that we have a good learning management.

In all my years involvement with the management of self-paced instruction, I am pretty well persuaded that the whole column of procrastination is essentially a disease of mis-management. When there is a good management process going on in the course, there is very little procrastination and very little drop-out. And, of course, there is a high success rate among the students.

Human beings need to be organized, and they need to be managed. Self-paced instruction does not imply that the student has full control of the management of his learning. Indeed, he is probably more highly managed and more controlled by the instructor than he is in the conventional instruction format.

You will note in some of these materials that the faculty has developed an extremely tight organizational control of the student. They keep a proctor's log to accurately monitor the step-by-step progress of each student. They keep a very tight control on the student's interaction with the proctor. They do not allow him to "cop-out" and not show up for a period of time without due explanation and permission from the proctor.

In our situation, our open laboratory is also the learning lab and proctor space, for all self-paced courses are located in the laboratory area.

Faculty members schedule proctor times and announce them to their students. When a student would like to interact with a proctor, whether it be a student or a faculty member, he goes to the proctor area at the times when that proctor is on duty.

Our faculty have scheduled proctor times to vary throughout the week so that part of the proctoring is in the morning, part of the proctoring is in the afternoon, and part of it is after supper in the evening. This allows the student who must work or attend conventional courses to find a proctor time that suites his own schedule.

You will note also in the file that the faculty have prepared letters that they send to their students who are failing to achieve at a proper pace. In our system, we have evolved a procedure whereby, if the student

fails to make reasonable progress or doesn't show up at reasonable intervals at the proctor carrels, then he receives a letter asking that he come in and get his counselor at once. If he does not come in within a week, he receives a second letter which warns him that he will be dropped by the instructor from the course if he does not come in and discuss his problem.

We have instituted the "Q" grade which is "Q" for quit, really. It is a drop without penalty. The "Q" grade can be initiated either by the student or the faculty member. It will go to the registrar as an indication that the student is terminating his involvement with the course. It does not imply an "F" grade. It does not penalize the student in any way. He can re-enroll as soon as he and his counselor agree that it is expedient to continue with and complete the course.

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. (No specific answer was given to this question.)

B. Q. *What sort of orientation does the mentor give the entering student?*

A. (No specific answer was given to this question.)

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, the completion of modules, and the issuance of the next sequential module?*

A.. We have a variety of schemes for the issuance of learning modules. I know the pattern now among our faculty is that, as soon as they get the course fairly well organized and all of the learning modules completed, they will issue all of the modules to the student at the outset of the enrollment. Other faculty prefer to issue the modules to the student a unit at a time, the student being allowed to receive the next unit only after satisfactorily completing the unit that preceeds it.

I don't think there is any set pattern, and I don't think there needs to be one. It depends upon the management style of the instructor and the objectives of the course. We do encourage, however, and insist that as soon as the course is well enough formulated that there be complete modules or learning packages ready for issuance to students, that they be issued to the bookstore, and that the students buy them in the same manner that Bob Toft manages his learning materials.

We feel that the learning modules that have been written by the faculty should be paid for by the student in order for us to re-coup at least our clerical costs.

We do not have any intention of getting into a royalty arrangement with our faculty for the learning modules that they sell to the students through the bookstore. However, we encourage the faculty to package their learning materials for a course into textbook form and make any private arrangements they would like with book companies to sell the materials on the open market and receive personal royalties in the same manner we have done for conventional texts. I see no reason why the learning activity packages created for this kind of a model can't be treated in the same way that the textbooks have been handled for the conventional model.

One of the important attributes of the individualized learning management system and the development of competency-based learning activity units is that you can institute a pre-test or entry-competency programs. At this point, our last science-degree programs are the most sophisticated in this development. They do, indeed, have a series of pre-test, learning modules that a student must attempt before he is allowed to enter the learning activities of a degree program. He is given an opportunity, upon enrollment for the degree program at our University to write-off all of these pre-major modules and to certify that he, indeed, does have adequate background skills.

There are a series of 15 to 20 competency majors that he can attempt. Any one that he fails to achieve is signaled as a remedial instructional unit that he must study before he is allowed to proceed to those units that require it as a prerequisite.

Our engineering discipline is also planning to develop a series of entry modules for determining prerequisite competencies. Chemist also is developing programs along this line.

There is a management problem, however, in the implementation of these remedial or prerequisite study units for threshold entry into a degree program; and this is the matter of crediting the faculty's teaching load to the management of these remedial, non-credit-types of instructional activities.

In two of our disciplines, we have packaged these remedial units into a course which does have variable credit. All students who fail to master a reasonable number of these entry modules must enroll in that course so that we can give faculty credit

and get tuition payment for the extra amount of instruction that he is taking to remediate his prerequisite skills.

I would think that this particular aspect of learning management would be extremely relevant to the community colleges because they have an open-door policy and get such a wide variation in background skills among their students. It seems imperative that you have pre-test, competency measures and some sort of remediation program. I am disposed in the direction of management of the remediation program in the same way that College IV does; that is, when a student has been inventoried at his entry and found to be lacking in a number of skills, these prerequisite, learning modules can be purchased individually, one at a time, by the student; and the faculty would be credited on the individual load of learning modules that he administers. I prefer this rather than packaging all of the learning modules into a course that the student would have to enroll in and pay tuition for because the number of units that each student would want would vary greatly. It would be hard to administer a course-packaged, enrollment system.

Along this line, I think that the pre-test program in the learning management system is one of three of the most important attributes of the new competency-based, learning-management system -- the other two being the self-paced, individualized-learning system and experiential, learning component.

There is more to pre-testing than merely giving the student a chance to demonstrate competency in certain prerequisite skills for individual courses or degree programs. One of the things that we overlook completely among the entrance requirements is their competency in mental skills. It's one thing to have demonstrated certain learning accomplishments prerequisite to a degree program; it's another thing to demonstrate the ability to use your head in the first place.

We take for granted that a student is able to read, that he is able to remember, that he is able to comprehend what he reads, that he is able to converse and listen, and that he is able to do simple logic and synthesis skills.

If he doesn't have these skills, it's just tough luck; and nothing is done about it. I think it's imperative -- especially at the community college level -- that all entering freshmen be inventoried for their mental skills and that remedial self-paced modules be made available to improve these skills so that their I.Q. efficiency is up before they ever enter the learning track.

I call this program a mental bootcamp to train students so that they are conditioned for the big intellectual war they are about to embark on in higher education and so that they have the physical and mental skills tuned up and so that they can be more efficient and have a higher degree of success.

To my knowledge, there is virtually nothing being done to improve the mental skills of entering freshmen, to prepare them for the rigors of higher education, and to develop good study habits -- good

input and output efficiences in the use of their mind as they interact with the learning materials.

D. Q. *What are the forms involved in this sub-system?*

A. (No specific answer was given to this question.)

E. Q. *What communication system is installed to inform other sub-systems; i.e., registrar, computer, administration, etc., of the progress of each student through the overall system?*

A. (No specific answer was given to this question.)

F. Q. *What number of weekly hours are spent with students by the average faculty member?*

A. (No specific answer was given to this question.)

G. Q. *What is the student-teacher load?*

A. We have found that our faculty are averaging between 12 and 25 minutes per person per week in their proctoring activities for self-paced instruction. The minimum seems to be 12 minutes per week per student, in a three-credit-hour type of course enrollment. At the present time, in our self-paced continuous engineering program, our engineering faculty are proctoring approximately 40 enrollments each, or approximately 120 credit hours of instruction; and this proctoring is scattered over the equivalent of eight different courses, simultaneously, or each engineering faculty member has 24 credit hours of instruction under his management at all times.

Each faculty member programs approximately 12 contact hours in a proctor carrel for himself each week. This varies, of course, with individual faculty members; although I suspect that it more closely comes to eight proctor hours per week.

H. Q. *Are there any special pay considerations involved?*

A. There are no special pay considerations for proctoring self-paced courses. They are treated as a normal load. On the basis that ten self-paced students -- enrolled for three-credit hours each -- represents a minimum course load, each faculty member is expected to administer 12, conventional-course-credit hour equivalents for a full load.

I. Q. *How is a professor's roll changed as compared to those who are engaged in the lock-step system?*

A. There is a significant change in the instructor's role when he is administering a self-paced program, compared to conventional.

He is now in the role of a learning manager and he takes individual responsibility for each of his students. As a matter of fact, we administer our self-paced program in the same way that our faculty have been managing their Ph.D. candidates. Each student is treated as an individual degree program student. He works up an individual plan of study. He has great flexibility in the construction of this plan of study and the option to alter it as his interests and needs change. He proceeds through his courses under the close advice of his counselor or mentor. Each faculty member looks after his students, the students that are enrolled in his self-paced course, on an individual basis. He is quite concerned about their daily progress.

None of our faculty in the self-paced program offer any group lectures at all. Everything is done on a tutorial basis -- one-to-one.

One of the engineering faculty members -- who is administering eight different courses simultaneously to some 40 enrollments at this point -- says that he could handle more than this and that this is not an excessive load, whatsoever. Other people who have been managing self-paced instruction have reported that the actual contact hours traffic of their enrollment runs about 20%; that is, that at any one time interval, about 20% of the students are interacting with the professor.

I don't believe we have been into this long enough to know what is the upper limit or what is saturation for the number of student credit hours that a faculty member can generate under a self-paced or individualized management.

One of the things that it depends on heavily is how well organized the man is and how good his materials are. Our faculty keep close track of the performance of each learning module; and when a learning module tends to have a high re-cycle rate on the assessment items, or there is a lot of tutorial traffic, the module is carefully looked at for rewrite and learning difficulties. As soon as they have detected what the problem is and corrected it, they find that the amount of interaction demanded by the students in tutorial sessions and re-cycling of exams sharply drops off.

One professor at the University of New Mexico kept an accurate record of the number of re-tries and the number of tries on each exam for each of his modules. All exams that had more than 1.5 re-tries, on the average, was rewritten; and the next term, he completely eliminated in seven of his highest (or his worst modules) all re-cycling. This kept down the amount of clerical traffic and tutorial burden on him by better than 50% the next term.

It's quite conceivable that the very bright students would need very little interaction with the professor on his learning modules; and that the assessment items for each module could be administered by a clerk. As a matter of fact, in our learning lab, now, the math group has formed a consortion with management and

psychology to keep a student available in the learning lab to merely pass out and administer assessment items for various learning units for a variety of courses.

You might be interested to know that, at the University of Texas at Austin, in the Mechanical Engineering Department, Professor Wagner has developed a computer management routine whereby the computer can be used to make an infinite number of varieties of text copies for each learning unit. This is particularly useful for the learning units that are dealing essentially with acquired skills and knowledge. It is of very little value when you get into the more sophisticated levels of learning requiring systems analysis and judgement.

In our operation, all of our faculty allow the student to re-cycle on an assessment item for a learning unit as many times as he wants to -- there is no upper limit. However, none of them expect a student to re-cycle more than two or three times without their getting down to finding out why the student is in trouble. One faculty member said he has no more than four variations of the assessment items for a learning unit, and he rarely has anyone use all four.

I'm a great believer in capitalizing on the opportunity in modularized instruction, to allowing variable credit. What I'm really saying, basically, is to develop a curriculum whereby each course and each curriculum would have the flexibility that you would allow for the degree program itself. A curriculum should be made up of a whole series of learning units or modules in some sort of an integrated hierarchy. The student should have the option to take parts or branches of this hierarchy and to have it supplimented in various ways to suit his own objectives. When you do this, then, you'd allow the student an opportunity to custom-make a course without creating an additional management burden.

In addition, various parts of the course could be assigned to different instructors and this would, then, get you into interdisciplinary instructional management within the course itself. For example, specialized items in a course, a group of modules in the specialty, could be written and administered by the faculty member who has that particular specialization.

The management of such a course, then, would require that you have variable credit. We have built this into our system at UTPB where each course can have variable credit of one to "X" number of credit hours, depending upon the needs of the student. From a registrar's point of view, then, each time the student registers for a course, he gets a specific and unique computer number assigned for each credit hour quantity that is applied to that student's enrollment. The course then becomes unique for that student for the number of credit hours that he enrolls in.

By having variable credit, you can then make the administration of tuition, and enrollment procedures a little more efficient

in that the student can then put together lumps of units into a credit hour package and pay tuition on the basis of the number of lumps that he assembles for that course.

I think it is appropriate under this particular section to discuss the third most important attribute of the learning management system: the implementation of an authentic-involvement component in the instructional program.

I have assembled a file folder showing the samples of the mentor log, the plans of studies, the authentic-involvement study contract, and the agreements that we have devised to administer both the plan of study for the individual student's degree program and the administration of the authentic involvement component in his plan of study.

I think it is imperative in the new learning-management system that some proportion of the degree programs be devoted to an internship or realistic involvement of the student in real-life, problem solving situations and this can be applied to any discipline at the University of Texas, Permian Basin. This is required in all the disciplines.

The prerequisites for authentic involvement are that the student must be assigned to a project or research activity, off-campus in an area that is germane to the degree program he is studying. The project activity must be in such a nature that he has full creative licence to exploit the problems in the manner that would be needed to reach whatever objective was set for the study program.

We encourage our authentic-involvement students to work in teams. This is especially so in the engineering and the management areas where they can be assigned as pseudo-consultants to an industry to solve a live, hot industrial problem, independent of the people in the company who are also assigned to that problem.

There is a great deal of benefit for students working together on an off-campus study. It not only teaches them teams-manship, but it also allows the students to be involved in a more sophisticated and elaborate problem that would require more than one person to execute in the time frame allowed.

You will notice in the agreement form that we devised for the authentic-involvement-project activity that there are some specific statements regarding liabilities that are involved when a student is interacting with an industry, especially as it involves safety, exchange of money or patent and invention rights. We discovered early on in this activity, when I devised it some eight years ago, that we had to work with the company in a very realistic way to assure that there was a very clear-cut understanding of the relationship of the students to the company and that the company's security was observed. If you don't do this, the client organization will not be willing to have students working on sensitive and important

projects which are so valuable to the authentic involvement experience.

One thing we try to avoid in assigning students to work on problems for any kind of a client organization is that the problem that they get involved in is a real one, a live one, and not a fake. We discourage any client from fabricating a pseudo-situation for the student to work on. This is what we have been trying to avoid altogether.

The laboratories on campus are pseudo-experiential situations. The students and faculty know that they are contrived. But, when you put a student out on a real project with some client organization, then there is no doubt whatsoever that he's involved in the real thing and that his own reputation as well as his school's reputation is on the line.

I have also included the study-contract-agreement form that we use. It is for the student's benefit to describe what is going to be required of him in his involvement in the authentic involvement activity. It specifically defines the activities that he must accomplish and also explicitly defines any logistic conditions that must be met if he's going to be working on site with the client organization, what safety and liability requirements are going to have to be observed. Also, it is very necessary that you be explicit in defining what is going to happen as a result of the student's study ... who owns what, who has rights to them, must they be secret, and so forth.

There is a great deal of management expertise required in instituting an effective authentic-involvement activity. The typical research-oriented, graduate-level faculty on the conventional university is quite adept at picking up and administering and managing authentic involvement programs, primarily because he's conditioned to adminstering students who are working on real problems in industry, to be a very heavy and exciting experience for him; and he ends up developing a very good working rapport with a number of industries and, indeed, tends to win a bunch of consulting contracts because of this activity.

However, faculty who have not been involved with outside organizations in the management of people, working on problems with them, will find this to be a very new experience; and it will take some time to get them oriented to managing this properly.

There is also the problem of training the cooperating client or organization to assure that they understand the objectives and will work it in a proper way. The handling of the authentic involvement project activity for course credit is altogether different than administering a Co-op program wherein the student divides his time equally between campus activities and a job activity. In many cases, the job activity is not well coordinated with his campus activity.

In the authentic involvement program, it is indeed a course and is not unlike assigning the student to a graduate-level thesis activity. The difference being that he is working on a project solicited from some organization or industry off-campus, and he has a specific objective to achieve for that client organization.

Many of the client organizations have no idea how to handle the students. Their first apprehension is that they must hire him as an employee. You've got to overcome that block at the outset.

And they also must understand that they are not even obligated to supervise the student; that it is the faculty member who is supervising him, that the student is working for them as an unpaid, independent consultant. The industry must understand that the student is working with them and not for them. The student must be given complete freedom to attack the problem in any way that he sees is necessary to achieve the results. He cannot be biased by the company's own preferences as to how they would like him to go about solving the problem. The company is only obligated to state the nature of the problem and the solution desired. And they must leave the student alone to devise his own way to getting there.

Likewise, the faculty must learn that, when the student is involved in authentic-involvement activities, they are not obligated to know what the solution is ahead of time; nor are they obligated to guide the student towards the solution by suggesting ways to go about it. The only role that the faculty member has is, essentially, the same role they they would have if they were chief engineer for a private activity. They merely see that the working engineer has the tools and resources available and to assist him in achieving the problem by finding other information sources and tapping consulting specialists and the like.

The whole name of the game is for the student to plunge in and learn how to do it himself, and then to have the opportunity to interact with his colleagues and the instructor in a feedback situation to discuss why they didn't get where they are going, what they should have done, or what they ought to do -- through brainstorming sessions and bull sessions -- to psych out their own ideas and methods for attacking any particular situation.

The reason I'm particularly adamant about the inclusion of authentic-involvement activity in the self-paced instruction format is that it's extremely relavent to individualized learning and the freedom that is allowed with modularized individualized instruction. It provides the opportunity for a student to take on studies with outside clients in this more sophisticated learning mode without being hampered by the time constraints of conventional instruction.

One of the weaknesses of conventional instruction is that it rarely ever provides an opportunity within the classroom learning situation for synthesis, analysis, and judgement. The consensus is that it rarely gets above the third level of the taxonomy of learning. This new learning-management system provides, then,

the opportunity for you to intergrate into the learning programs this vital activity, which I call authentic involvement, which exercises a student in obtaining the skills of synthesis, analysis, and judgement.

V LRC

Introductory Remarks

To my mind, a learning resources center is a very necessary system component for the individualized learning management system. It is a support facility that not only has a responsibility for providing self-access learning resources in all facets of communication media but it also has a responsibility for assisting the instructor in the preparation of efficient instructional materials.

At our University, our learning resources center, as I have mentioned before, is an all-inclusive, service facilty -- providing not only check-out services for various off-the-shelf, pre-prepared media, but also providing instructional resource for the faculty in instructional technology, for developing medium materials and providing computer activities.

A. Q. *What is the system for checking out and returning learning modules?*

A. In our learning resources center, all self-accessed media is checked out in the same way as books -- whether it be TV, tapes, audio-tapes, slides, filmstrips, or any of the equipment that is used to play them on. All can be checked out and accessed by the student in the same manner that books are.

B. Q. *Do you have study carrels equipped to handle AV equipment?*

A. Our learning resources center now has about 200 carrels for 1300 students. These carrels are divided into 10 vidio-tape carrels, 50 cassette-slide carrels, 20 film strip cassette carrels, two 8mm loop projector carrels with cassette play-back units, and about 100 unmediated carrels. The formula for determining how many carrels should be available in a learning resources center seems to be that about 20% of the full-time students should be able to sit at carrels at any one time.

C. Q. *Is a record of time spent at carrels kept by the Learning Resource Center?*

A. All of our carrels are self-accessed, and the student can use them as long as he finds it is necessary.

I should mention here that one of the most efficient uses of self-accessed TV-taped programs that I've ever seen is at Wooster Poly Tech. They have equipped their library with a number of one-half inch TV-tape-play-back units. The faculty can make one-half inch tape-lecture demonstrations and install them in the library for check-out by the students. They have made it one of the most economical operations I have ever seen.

The studio, for making TV tapes, is nothing more than a classroom with a couple of fixed cameras in it -- one looking down on the instructor's desk and one looking at him. A graduate student or a student monitors the tape play-back machine.

The average length of time to record a 30-minute program is about 32 minutes. The tapes are admittedly quick-and-dirty but they are real and very relevant to the instructor. And, because they are so informal and because they are so typical of the instructor in the course, the students find them to be extremely relevant to their instruction -- and there is a very high traffic.

They have, at the moment, made about 600 of these 20-30 minute tapes and are now installed in the library. The play-back traffic is so high that they have had to add more than 10 play-back units to the library. I have never seen any institution in the country that has had as much success with the use of TV tapes for instructional support.

Our learning resources center has three divisions. I have supplied an organizational chart for our center. It's in the file on "authentic involvement and plans of study." The center has three divisions: computer services division, the library services division, and a media-production services division. Each has an associated director as head of it and its own staff.

It is our contention that all instructional-development activities should be centered in the learning resources center under the media production division. They are also responsible at our University for the organization and conduct of workshops for improving the instructional expertise of the faculty. I have included a copy of the workshop materials that have been developed by our media services division for the workshops that we conduct for our faculty.

D. Q. *How do the LRC personnel know that a student is authorized to check out a certain learning module?*

A. The LRC makes available off-the-shelf resource materials to anyone who holds a student card for any purpose that he wants to use it. It should be noted that the instructional materials for a course are essentially managed by the faculty. The LRC operates as a supplemental resource to the actual instruction in the course, in the same manner that the book library has always served conventional instruction.

E. Q. *Are special personnel required for the LRC and the module production lab?*

A. (No specific answer was given to this question.)

VI MISCELLANEOUS

Introductory Remarks

Many of the questions you have asked under miscellaneous I have answered in one or more ways under the sub-division of faculty.

A. Q. *If a student is to perform the activities comprising a learning module away from the campus, how are the hardward requirements monitored?*

A. (No specific answer was given to this question.)

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. (No specific answer was given to this question.)

C. Q. *How are the educationally disadvantaged, minority students, and "fast" students provided for in your system?*

A. We feel that, in our system, it is inherently flexible to accomodate all individual differences. This has been demonstrated on many campuses, that the individualized management system will be particularly attractive to the very bright and to the very disadvantaged primarily because it serves both much better than the conventional system.

In the case of the bright student, he has a tremendous flexibility to move as fast as he desires and to proceed in a variety of paths to suite his interests.

For the disadvantaged, the fact that he is diagnosed frequently, that his skills or lack of skills are assessed in advance, and that the hierarchy of the courses are constructed to provide small enough bites to give reinforcing success points is a great advantage to him. He does find an opportunity to achieve success probably for the first time and in courses in which he did not think he could succeed in.

D. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. There is no better promotional method that I know of to attract students into this system than to have successful students go out and talk it up. P.R. material for a new system like this is inevitably confusing and counter-productive in my estimation.

We have found that the most critical point in the implementation of a new student into the individualized learning system is what I call the vital first hour -- when the instructor first meets the students and presents to them the way in which he is going to manage the course -- will make or break the student.

In general, when the student approaches this course for the first time, he is extremely apprehensive; and he must be made to know at the outset that the thing is packaged for him to win. He must be made to realize that he has more opportunity to learn than he ever had before, and that he has control of his learning although the instructor is going to be very much visible to him.

E. Q. *Do you require your producers of learning modules to demonstrate competence in their area before employing them in your system?*

A. I'm very sensitive about this. I don't think we have any problem assessing the technical competencies of the faculty member in his discipline. And, of course, when we recruit, we always look to see that they are technically competent.

The big problem we have, however, is not their technical competence, it's their educational competence.

To my mind, most faculty are educational illiterates. They manage learning only intuitively, from experience; and most of them have absolutely no technical background in educational technology at all.

I think it's imperative that the faculty be involved in a learning-management workshop. This workshop should have three components, in my mind:

1. How to write behavioral objectives and performance compatible assessment items;
2. How to construct a learning activity unit in a hierarchy of learning activities for the course; and
3. How to manage the course after the materials are written.

F. Q. *Do you have an educational technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

A. I have been involved in workshops for some 1500 university-level faculty people throughout the United States for the past several

years, and I've come to the realization that faculty at this level are very sophisticated intellectually and are put down very quickly by a workshop that is pedantic and tedious in its jargon and its speed of delivery.

We originally started out with a three-day workshop; it had 11 self-paced learning units in it. Since then, I have evolved down to a half-day, self-paced workshop with six units. The rest of the workshop time, which I have now scheduled to a day and a half, is devoted to interactive discussions on concepts, management strategy, and operational detail.

I have been continually amazed at how faculty members who grab hold of the concepts are intuitively inept at pulling it off. It's amazing how consistant they are in doing it wrong. It is also exhilarating to see a faculty member who knows how to do it right. The success he has and the learning achievements that his students demonstrate in his course are almost unbelievable.

VII EXTRA COLLEGE ASSISTANCE

A. Q. *To what extent are off-the-shelf learning modules, commercially produced, used in this system?*

A. In our system we are attempting to use as much off-the-shelf learning media as we can possibly assemble. At the upper level university, this is very difficult because there is not much material available. At the high school and junior college levels there is a great deal of commercially produced media and support materials that would be a great deal of help.

One of the problems you face here, however, is that the faculty seems to have an in-built resistance to using anybody else's materials. They all want to go back and re-invent the wheel every time.

It's amazing how critical they can be of someone else's material, who have spent infinitely more time on developing it than they have developing their own.

Some of our faculty who are well evangelized into this new method are very open to soliciting material from their colleagues on other campuses who have already generated learning units. They also are open to buying commercially produced media materials and having them put into the library as supplemental resource.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

A. We do not use outside consultants in the production of learning modules. I think learning modules must be constructed by the faculty who is to manage them; or, at least, he must be involved in their selection and integration into the whole course design.

I think we are rapidly moving into the realizations among the faculty who are involved in this kind of teaching that someone else's material can be used just as well as they have in the past been able to use some other author's textbook. You can get them to use another author's materials provided they have full control in devising the over-all learning strategy for the course and are able to implement these materials into the learning strategy that they want to without outside legislation.

I might add at this point that I, in my observation of the development of learning materials and the involvement of faculty in authoring them that there is absolutely no efficiency gained

whatsoever in giving the faculty advanced released time and other supplemental support. The successful faculty that I have known, who have developed learning materials, developed them as a normal part of their work load in the same time frame and context that they developed the materials for their conventional instruction in the past.

Most of our faculty who have been involved have found that to prepare the entire course in advance is a waste of time, because so much of it has to be done over when it actually gets under way with the students. They find that they mis-judged student progress and student interaction with the materials. The successful faculty have generated the materials as they went along.

The first semester they taught the course was "hell on wheels" because they wrote materials as fast as the student ate them up. Nevertheless, the materials they did write had better continuity with the materials that went before them, and it was easier for them to re-vamp the materials the second time around than to try to polish them up before they ever got them in front of the students.

Also, the faculty who were involved in the development of new learning materials and learning units find that the students are a great deal of help to them in critiqueing the units and in making suggestions as to how they ought to be reconstructed. Some of the faculty have taken advantage of the tremendous resources of the students and have required students to prepare a module or to write a module as part of the instructional activities in the course.

Our frank opinion is that there is no need to rely on commercially produced materials. I can't ignore the fact, though, that when more and more commercially produced materials become available that it will increase the efficiency of the management and design of these kinds of systems because there will be more resources to draw upon and less re-invention of the wheel. We will have to overcome, though, the reluctance of faculty to use other people's materials.

VIII PLANNING YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year: i.e., production of learning packages, developing of systems, etc.*

A. I can't give a lot of good advice on how to go about planning and developing a system before it goes on line even though I have been involved in the development of two learning systems from scratch. My hindsight has shown me that much of the idealistic schemes that we devise during the planning year have to be abandoned when we got started anyway.

When I was at Oklahoma State University, I was responsible for the development of a forty-credit hour package for the freshman and sophomore years involving all of the math, science, and communications that would be taken by Engineering and Science students. This entire package was to be put on line as a self-paced instructional unit and an integrated hierarchy of learning modules. The whole intent was to start up a subsystem on the campus that would have a higher success rate than the conventional courses that screamed out and flunked out so many pre-engineering students.

We got a grant from N.S.F. to allow us to hire the 14 faculty members for a full summer before we were to put this system on the line and the intent was that the faculty would use this summer to write modules and get their courses ready to go for the Fall.

All of these faculty members were put through the three-day workshop so that they were aware of the techniques and technology that were to be employed in the development of this material. The only effective use we made of that summer were the weekly two-hour bull sessions that were held at the end of each week to determine how things were going.

We found that, during the week, although the faculty was engaged in writing materials, they made very little progress in getting clear through the course. Many of the materials they produced they re-did over as they went along in the Fall semester, anyway. We would have been better off if we had spent time with them discussing the various management and implementation procedures and techniques that they could employ than to giving them all that time just to write learning units.

When we opened our University at Odessa, we had very little time for faculty to prepare units. We brought them all on board on July 1 and gave them the initial workshop on educational technology; then they had about three or four weeks to begin preparing materials for the opening in the Fall. They had very little chance to write modules, and most of them did nothing more than to get the first or second module and write the course outline. This was sufficient, however; and although they worked their tails off, they did develop the courses as they went along.

I think that it's unrealistic to attempt to develop whole learning packages fully mediated in the planning year. In my experience and what I have observed of other systems that have gone into effect, the media comes second.

The most important thing is to get the course broken down into a series of learning activities and modules and to well-defined objectives and assessment items. The course should be taught and debugged until its strategy and effectiveness of the learning activities is qualified; then you are ready to enrich the course with supplemental media and the other efficiency and time-saving devices.

I think it's too expensive and somewhat useless to attempt to devise the media that is to be used in supplement of the instruction before you have had a chance to determine if the instruction is what you really want and in the order and in the strategy that is relevant to the objective of the course. Our faculty are just beginning to add more and more media. Now that they are through with the initial units in some of the courses, they are spending their time making supplemental tapes, TV demonstrations, and scrounging up other materials that will take the tutorial load off their back and provide more instructional backup for the student. It kind of gets you into the area of trying to make the horse drink after you have got him to the water. If the horse is thirsty, you will have not trouble getting him to drink; but, until he realized he needs the water, he isn't about to drink.

So, likewise with the faculty. Until they realize that the media is going to be a great deal of help to them, it's pretty hard to drive them into the media production facilities and have them whomp up some of this stuff. They regard it as a terrible creative chore. Until they see the need themselves, we have trouble getting our faculty to make tapes and the like. Now that they have discovered that if they had them it would sure take a lot of tutorial load off their backs, they are beginning to make them.

I think one of the important things during the planning year is that the faculty be supported by a well-thought-out management plan. You need to have the necessary management forms made available; procedures have to be defined so that, during the year of implementation, the faculty isn't burdened with consuming a great deal of energy and time devising procedures for handling the process.

One of the most difficult tasks the faculty has -- and one of the short comings of most individualized learning systems -- is the development of an integrated hierarchy of learning materials for the courses and the degree programs. Most of the faculty can be persuaded to outline a hierarchy of learning objectives for their course, and that's one of the first things they need to do. But, one of the second things they need to do is to look to work with each other in the disciplines and in the "as-a-team" effort to determine whether or not they are requiring learning activities that are redundant or are repetituous in the student's overall learning plan.

Also, it's necessary for them to determine for each learning activity how many prerequisities skills are necessary to succeed in that learning activity, and where will these skills be learned. Will the faculty be responsible for the student getting them, or will the student be required to get them in someone else's course?

What I'm saying here is that it is extremely important that the discipline develop an integrated learning hierarchy for the entire program that the student must track through in order to get his degree.

When you're in a modular form of instruction, you're now subdividing the curriculum from three credit hour learning packages down to mini-credit-hours, learning packages. So, the problem of developing a plan of study isn't dealing with 30 or 40 three-credit hour packages; it's dealing with several-hundred, fractional-credit-hour packages.

Each of these learning activities in its own right is just as important in the hierarchy as a three-credit-hour course. It has to have its prerequisites defined, and it has to have its place defined in the learning track of the student.

When we developed the project at Oklahoma State for the freshmen and sophomore science and math courses, the most significant thing we did that summer was to develop this integrated hierarchy of learning modules involving some fourteen different faculty members. We required each faculty member in each course to write his learning activity modules on a color-coated card; then we asked them to put these cards up on a big display board that we called the "War Board." It was up all the way around the room. Each of the faculty that were in the developing units put his hierarchy up in his own color code; then we asked all of the faculty to go and look at all of the learning units that their students will be subjected to and see how many of them were overlapping.

To the amazement of the physics and chemistry faculty, they discovered that almost 60% of the learning units that they had independently derived to be put in their course were redundant and overlapped each other.

It was very easy, then, for them to take these two cards that were identical in the two different courses and make them into

one learning unit, and merely point out to the student that, when he went on to the next unit in physics or the next unit in chemistry, he had to have that common unit. This allowed us to be more efficient in the learning hierarchy for each of the two courses and also gave us an opportunity to add enriching modules at the end of the courses to make them more effective, all by eliminating redundancy.

Another very important thing that needs to be done during the planning year and before the implementation year is that the faculty must sit down and agree on the terminal objectives for the degree program in their discipline.

This is one of the hardest things that a faculty ever has to do, and it's one of the most difficult things for them to come to a common agreement on. Once the faculty in a discipline can agree on the exit skills for the degree holder in his discipline, the kinds of learning activities that are necessary to achieve those skills become quite clear. It becomes evident that many of the classical courses that they've always had in these degree programs are irrelevant, at least in 50% of their content.

In effect, in developing the learning hierarchy for a degree program, you almost have to start at graduation day and work back to admittance day with this whole hierarchy of activities. Once this is done, it is very easy for the faculty to pick out those units that they want to be responsible for developing and administering ... ones that match their own background skills.

When you're in this kind of a learning-management system, you must abandon the conventional three-credit-hour course and get down to the actual learnable skills that make up the whole degree-holding person at the end of the study track.

There is a tendancy for faculty to hang on to the classical courses that they've always been responsible for and to try to repackage all their learning units under those same labels.

This also brings up, then, the whole problem of packaging the learning system into a manageable system-of-units that you can charge tuition for and record on the student's transcript. Once you have developed an integrated-learning hierarchy, then you can block off these units into credit-hour packages all the way from one-half credit hour packages -- such as in College IV -- up to six credit hour packages, maximum, that we have at the University of Texas at Permian Basin.

It doesn't really matter what the size of the credit hour package is as long as there is an identifying scheme for the student to enroll in it, to pay tuition for it, and to receive acknowledgement of attainment in it on his transcript.

I tend to favor the one-credit-hour module as the minimum enrollment package for administrative purposes. I'm not sure whether the one-half credit hour module is a feasible, or efficient, minimum-size package for enrollment purposes. However, the way

College IV handles it is not at all bad since it's done in a very informal and easy way. That may be the better mode in the long run.

In any case, the management scheme for charging tuition, giving faculty-load credits, and giving transcript credits must be devised to accomodate and enhance the flexibility of the individualized learning-management system.

IX IMPLEMENTATION YEAR

A. Q. *Please list the major activities and events that must be accomplished during the implementation year; i.e., field testing, evaluation, admissions, etc.*

A. I think the most important attribute of the implementation year is to provide adequate and frequent opportunity for the faculty to get together and close the feedback loop.

There has to be opportunities for diagnostic remediation among the faculty in their implementation of these new schemes. They need the opportunity to share the agonies and the ecstasies of their implementation ... to hear how the other guy did what he was doing and to share what worked and what didn't work.

I think it's also very helpful if the system can afford it to have an advisory committee that can come in about twice a year and listen to the whole proposition from those who are dealing with it and to be able to pull it all together and feed it back to them in an unemotional viewpoint.

Other than this, I hate to suggest any other strategies to pull off because the implementation year is so heavily skewed by the constraints of the total system that it has to work within.

There is always a great deal of agony and stress in the implementation of new schemes. Everybody is unfamiliar and insecure and there is just a lot of socialization problems in the process of developing something new.

The problems we faced at the University of Texas during our first year are not typical problems because we were harrassed by the entire process of formulating a whole system and physical plant, the socialization of the whole new faculty team, the development of administrative procedures, the lack of equipment, and the lack of adequate systems support. It is much easier to implement a sub-set, a new sub-set in an existing system, because the support facilities are all in tact and available.

X BOOKSTORE

A. Q. *What involvement does the Bookstore have in the selling of software to students?*

A. The bookstore has an important role in an individualized learning-management system in that all of the learning activity modules should be sold to the students, in my estimation, rather than be available for checkout in the library at no cost ... as College IV is doing. We are asking our faculty, when they get a unit prepared for distribution to the student, that units be sold to the student in a packet at the bookstore.

There are two ways that you can do this: you can fill the packet completely and sell it to him at the beginning of the course, or you can sell him an essentially empty packet and then fill it as he goes along.

B. Q. *How are prices determined?*

A. We essentially are pricing our packets on a no-profit basis. We determine the actual production cost of the packet, which is essentially the printing costs, and then sell them to the student at that cost plus the 40% markup, which is the overhead requirements of the bookstore to meet their operational costs. In any case, the costs are moderate.

C. Q. *Does the creator of the module receive royalties?*

A. We give no royalties to the faculty. We attempt to make no money on these modules we prepare and sell in our bookstore. If the faculty want royalties, the module has to be sold through a commercial firm.

Our bookstore has found that it has had to provide no special services just because we have a self-paced instruction format. The bookstore operation is flexible enough, as is the L.R.C., to handle the special circumstances of self-paced instruction.

XI EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel, and other components?*

A. To my mind, evaluation of instruction is one of the weakest and least developed areas within the whole process of developing a learning-management system.

I have been involved in looking at a large number of new learning management programs of individualized instruction around the country, and I have yet to see any of these systems paying any attention to the whole process of evaluating the faculty's effectiveness, which at the same time is also evaluating the effectiveness of the system.

You can only go so long in the development of a new system, in buying in and living off the inherent enthusiasm of those involved in the creative development. Eventually, though, they're going to want their rewards; and, it's extremely important that a very systematic and objective procedure be developed to assure that they are adequately recognized for the contributions they have made.

I have been involved with a faculty committee on our institution for two years in the development of a very-elaborate, faculty-evaluation system that will back up our learning-management program. There has been no problem in my activity in this area in developing a scheme that will do the job. Where the real problem lies is overcoming the three million years of conditioning that faculty members have regarding evaluation; also, overcoming the unbelievable inertia within the administrative process for the evaluation activity for the selection of those who should receive promotions, tenure, and awards.

You are well aware that, in the university level, all faculty rewards are based almost entirely upon research achievement; instruction never even enters into the process.

I'm not familiar enough with the entire community college structure to know how they go about passing out rewards, since their activity is largely instructional and there isn't the research component to use as the scapegoat.

In our institution, we informed every faculty member who intended to join it, that his instructional activities were going to be

visited by members of the faculty and administration. This was to assure us that we wouldn't run into any flack in proposing to inspect instructional activities.

We are now in the final phases of developing a report to the President for the entire evaluation scheme of our faculty. It essentially involves three basic categories: an information gathering process, an evaluation or analysis process, and a selection process for rewards.

Each faculty member has, in the Dean's office, a professional file that is kept by the Dean. It is confidential but not secret. That is, nobody can see it but the evaluation committees, selected administrators, and the faculty member himself. This file contains several data categories: one is a professional log which is, in essence, a diary prepared by the faculty member listing all professional activities, both on and off campus, that he is engaged in since he's been an employee. It also records historical information of his professional activities that he was engaged in prior to employment.

There is a category that contains documentation of all instructional activities, which includes summary reports of all student questionnaires that were received from students in his classes, grade reports, grade distribution reports, descriptive information about his course, course syllabi, and reports from evaluation committees that have inspected various aspects of his instructional activities.

We propose that an instructional evaluation team be appointed to inspect the course at least once every three years, to visit the course activities, look at all the course material, look at all of the operational data produced by the course, interview students and write up an extensive evaluation of the value, content, quality, and management of the course. This will be put into the professional file.

In addition, there is a category for peer evaluation. Various faculty members are asked to write extensive comments about their colleagues and sign them if they wish. They are put in the faculty member's professional file.

In addition, there are two files devoted to comments made by the faculty member's immediate supervisor and comments made by the faculty member himself. After he's looked over his file and, if he wishes, he may supplement it or put in any documentation regarding his own goals and his feelings of accomplishment toward those goals.

The faculty member is asked to review his professional file before it is sent on to the faculty evaluation committee to assure that it is complete as possible.

The purpose of the faculty evaluation committee is to look at every faculty member's file on an annual basis and to make an evaluation report to his professional file regarding their opinions as to his accomplishments and his progress relevant to his

colleagues. The faculty evaluation committees, then, are charged to report to the Dean a list of nominees who should be considered for promotions and rewards. The Dean, then, will use these nominations from the faculty evaluation committee to submit a list of candidates and their professional files to a separate tenure and awards committee who will review these candidates for various rewards ... those that should be selected for tenure, those that should be rewarded with raises or be selected to receive the outstanding-professor-of-the-year award in various categories.

Our evaluation scheme has two basic motives: to provide a very objective system for collecting information about the faculty member's achievements, with as much pure documentation and authenticity as possible.

The second function is to provide a closure so that, once a year, the faculty member receives a rather comprehensive and studious evaluation of his achievements so that he can see where his strengths and weaknesses lie and make some personal plans to for his next year's activities, to improve on his overall professional progress.

We've taken special care to separate the evaluation process from the rewards process. The most important thing we feel is that every faculty member should receive an assessment -- an impartial assessment, as much as possible -- of his achievements. Only a smaller percentage of the faculty will be singled out for special rewards; and these will be selected by a separate committee which will look at the personnel file folders, under the constraints of specified criteria, for each of the rewards for which they are to nominate candidates.

We feel that the establishment of an instructional improvement committee for the University be responsible for the implementation of an instruction evaluation process, the selection of the instruction evaluation teams, the organization of the criteria, and the evaluation of procedures to assure that every one of the instructional activities supervised by faculty are evaluated on a periodic basis by specialists, both in the discipline and in educational technology, to determine whether the course is adequate for the degree program, is of a quality that would be valuable to the student and the program, and that the instructional methods and management techniques are efficient and progressive.

XII COSTS — BUDGET

A. Q. *What is the ball-park figure for establishing a multi-media production lab -- keeping in mind personnel, equipment, supplies, and student workers needed?*

A. The ball-park figure for establishing a multi-media production lab from scratch seems to be about $400,000, to provide a facility that could easily back up the production for 1,000 studentr. This would be the capital investment needed. The operating budget would be in the neighborhood of $75,000 a year minimum. Of course, this is an open-ended thing. You can put as much money in it as you want to; and the more money, the more sophisticated it would be.

B. Q. *What is the cost of producing a set of learning modules composed of script, workbooks, taped lectures, film slides, and/or film strips, covering approximately 45 to 50 hours of instruction?*

A. Here, again, this depends on what you've got in mind. I would say it runs all the way from 0 to approximately $1,000 a contact hour if you are going to go to a full-blown, professionally slick, production job.

I am inclined to believe that the cost of producing media supported packages can be minimized a great deal if you follow the format that was used at WPI and other places, where the faculty is allowed to do it his own way in a quick and very informal type of taped production.

It's been my observation -- in seeing the media production units on a number of large campuses where they had a lot of money -- that the slick, super-professional, expensive production jobs have very little credibility to their costs compared to the informal, quick-and-dirty, but highly relevant, materials that a faculty member could produce as he goes along. The slick, studio produced television programs on the major campuses have lost a great deal of credibility; and this is in such a contrast to the quick-and-dirty, half-inch, self-playback, support materials that have been produced at WPI, which have a great deal of traffic and are liked by the students.

Unless it is important to have full color prints of pictorial information in support of the learning activities, you can get along just as well with xeroxed copies of sketches and line

drawings prepared by the faculty or taken from textbooks in support of certain visual or graphic materials. There is no reason why a cassette tape and printed materials can't do just as well as a cassette made up to operate color slides through a projector.

C. Q. *How many hours of production effort are required to produce one hour of multi-media learning?*

A. It looks like it takes, from what I can gather, about 40 hours of production for an hour of contact time, if you are going to go a slick production. This is quite consistant with the experience they have had in TV studios on major campuses also.

My overall assessments of the use of media and the development of a media-production facility is to put the emphasis on as much self-accessed-media production as you can get for the faculty. I'm inclined to believe that the faculty will put much more traffic on media-production if it can be done their way, in as simple a system as possible.

It's very difficult for a faculty member to get involved in a slick professional production. He, indeed, has to go through a great number of writes and rewrites, rehersals, and re-rehersals, tapes, and re-tapes under the guidance of professional people. That's very time consuming and very wearing on the faculty member; and he is inclined to avoid it like a plague. I don't blame him. I have seen too much effective media prepared by the faculty themselves in simple, efficient and economical ways that have been much more effective than these high-cost, slick productions. You'd be much better off to buy some cassette recorders that the faculty member can have, to take to his office or to take home with him. Also, buy a simple, inexpensive, half-inch, TV-tape system so the faculty member can, essentially by himself, produce his own TV tapes. As far as the rest of the media goes, give them access to a good xerox machine and he's in business.

D. Q. *How does the cost-effectiveness ratio of your system compare with the cost-effectiveness ratio in the lock-step system?*

A. The cost-effectiveness of the learning-management system, compared to the conventional system, hasn't been completely documented yet. There is a great deal of evidence, however, that points to the fact that it's going to be highly efficient.

The study done at the Oklahoma Christian College indicates that conventional instruction averaged about $23 per student credit hour operating costs; whereas the learning-management or individualized system ran from $9 to $14 a credit hour actual operating costs. It has been shown, in the conversion of the large lower-level biology courses from conventional format to self-paced format, that they were able to eliminate 90% of the redundancy of laboratory equipment, to reduce the amount of laboratory space by 60%, without increasing the number of contact hours of

faculty needed to run the course and with a 25% increase in learning effectiveness or the amount of contact time involved.

If you are going to ask me for a ball-park figure, I think the data indicates that, when you get a learning-management system debugged and operating at a steady state, it will operate at approximately 50 to 60% of the cost of conventional instruction for the same number of student-credit hours produced. There isn't an administrator in the United States that believes that, besides me and Bob Toft. Most academic administrators are convinced that self-paced instruction inherently has to be more expensive than group instruction. They are convinced that the use of media has to increase the cost of instruction.

They are also convinced that authentic-involvement activities have to be more expensive than in-house, laboratory activities. There is not one bit of operational evidence in the samples that are going on in the country to authenticate this folklore.

Unfortunately, we don't have any full-size working models that have reached a steady state operation so that cost accounting can be comparative. I know it's going to be more efficient in the long run, and I think that we are all striving to get there.

We have an integrated, open, self-accessed laboratory system at U.T.P.B. primarily because we can show, already, that it is at least 50% cheaper in capital investment than it would be if we have the same amount of conventional instruction laboratories assembled for a number of disciplines that are using this integrated facility.

CAMDEN COUNTY COLLEGE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. DONALD TOSTI

On Individualized Instruction

October 21 - 22, 1974

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Post-Secondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campus to advise Professor Mario J. Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Dr. Donald Tosti, who visited the College in the role of a consultant on October 21, 1974.

Dr. Tosti is the Executive Vice-President of The Independent Learning Institute, Corte Madera, California.

Dr. Tosti is, by profession, a behavioral psychologist who has extensive experience in designing and operating institutions using the individualized modes of instruction.

His company is currently running a kindergarten-to-high-school institution in California, operating completely under the individualized instruction system, which includes aspiration management (curricula designed around goals of students), achievement management (pre-testing, preparation of materials, progress testing, post-testing, remediation, and mastery learning), motivational management (all learning activities are designed around accomplishment of less desirable activities with expectations of most-desirable activities assigned upon completion), prescriptive management (provides students with the most efficient learning activities for him as an individual), and enrichment management (advanced learning given to students who want to deepen their understanding of their area of study.)

Dr. Tosti's school also uses programmed instruction and audio-tutorial programs which are converted into the individualized systems.

Additionally, Dr. Tosti's firm publishes self-contained, multi-media, learning modules in many college-level courses. These modules have been extensively sold throughout the country and prove to be very successful in achieving student growth.

Dr. Tosti has also authored many articles and books on the bodies of knowledge known as learning management & individualized instruction.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least 8 - 10 consultants. The synthesis will take the form of a consensus on how individualized

instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report, that will be presented to H.E.W. in June of 1975.

INTRODUCTORY REMARKS

Q. *Dr. Tosti, how do you define individualized instruction?*

A. The definition I use for individualized instruction is, "Individualized instruction is a function of the frequency with which decisions to change the instructional presentation is made as a result of the assessment of the individual student's achievements, needs, or aspirations." I give this definition both in my book, Learning is Getting Easier, and also in the paper called, "A Taxonomy for Decision-Making in Individualized Instruction."

Although my definition refers primarily to the frequency with which decision-making is accomplished, it also varies in the form that decisions take. I have indicated seven forms described in the Taxonomy Paper.

We have a totally open, enrollment policy in our elementary-high school. Students of any age or any ability may apply. As a result, approximately one-third of our students are very bright, another one-third are educationally handicapped, and the remaining group is somewhere in-between.

We have six-year olds reading at the 12th grade level and 15-year olds reading at the third grade level.

All of our instruction is individualized and students work on a daily contract. Upon enrollment, students are given a nationally

standardized test -- usually the California Achievement Test -- to determine their particular skills in reading, mathematics, language, science, and so forth. They are then placed in the curriculum according to their test results.

At each test level, we have a series of proscriptions appropriate for students who score at this point. Since no test is perfectly valid, we also observe the students in the curriculum to determine if, in fact, they have been placed at the appropriate spot. About 20% of the time we have to revise the prescription.

Students make up their daily contracts by reference to the prescription. On certain days, they may have a large number of reading tests. It is their selection, with the teacher's approval, which determines the given day's assignment.

Every learning activity in our school ends with some sort of progress check evaluation. These are usually objective tests; but, in some situations, they may be subject to evaluations done by teachers.

Learning activities usually run anywhere from 10 to 40 minutes in length, but some may be longer.

Our students are encouraged to complete their contracts each day. If students do not complete the contracts, they may be renegotiated on subsequent days.

We have provided additional incentives to completing a contract by allowing the students to earn afternoon activities -- such as field trips, drama, and so forth -- by virtue of having completed a contract. We also let all the students leave the school early once they have completed all of their activities.

This is a brief summary of school operations. If you would like more information, on our particular school, we do have a manual called, "The Learning School," which I would be glad to send to you.

FACULTY

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. All the systems I know of use a semester-based program. Students report to class with the usual class card and enrollment forms.

B. Q. *What sort of orientation does the mentor give the entering student?*

A. This is usually done on a large-group basis. There are several approaches that I know of and use. One has been to hand out a sheet indicating how the course will be operated. An interesting technique that has been used here is to actually have the students tested on the contents of the course structure as a first module. Mastery of the course logic is thus assured. It also has a second advantage of giving the students an opportunity to experience success early in the program.

A number of people have adopted the little booklet "It's Up To You", which is reprinted in my book, Learning is Getting Easier, starting on Page 129. This booklet can be obtained from Individual Learning Systems, Incorporated for $1.00 a copy; or reproduction rights can be obtained by writing to them. Anyone who has adopted our L.S. courses, may obtain them free for each student.

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, the completion of modules, and the issuance of the next sequential module?*

A. In the ILS approach, students purchase their modules at the bookstore, just as they would purchase a text. The modules are self-contained, including both text and workbook.

ILS supplies the instructor with three, parallel forms of each test in a multiple-choice format. A fourth form is in an open-ended, short-answer form.

In many cases, I've known people to increase the flexibility of their program by offering parallel modules to the text versions provided by ILS. For example, one teacher provided audio-lectures covering each of the subject areas. All students bought the text,

but they had their option of either going through the text-workbook form to passing a test, the audio-tape form, or both. Other people use the ILS package as the base, and add their own modules. These may involve other media, or other forms of learning; such as, problem solving, research papers, library research projects, and so forth.

In the ILS approach, there is no question of issuance of the next sequential module since students have all the modules available.

In most PSI-type courses, the modules are issued by the instructor. A student may not have the next module until he has mastered the one he is working on. Some people feel this is too much control in the hands of the instructor.

Billy Cohen, at the University of Texas, tells a story where a student in engineering was working very hard on a particular module. He had mastered it, but he could not take the test because of logistic constraints.

He wanted the next module to work on, but Billy reminded him of the rules that he could not have that module until he had demonstrated mastery of the present one. Billy noted that the student was so involved that tears began to run down his face.

When Billy Cohen reported this incident to Fred Keller, Fred agreed with him that it was quite significant. Keller had been saying that every student has a right to be evaluated. But Cohen modified the statement so that every student has the right to decide if he wants to be evaluated. Keller agrees with this statement.

On the subject of test taking, in both systems, the students decide when they are ready to take the test. There are some variations of this as pointed out in my Chapter on individualization within a fixed time schedule (Page 73).

On the other hand, there are certain administrative constraints which must be imposed. A testing center or an instructor's office is not always available day or night for all students. Probably, the most wide-spread timing schedule is that students can take tests during the time the class would normally meet; for example, if the class is scheduled under normal circumstances -- Monday, Wednesday, and Friday between 9 and 10 -- students can show up any time during that period to take their unit test.

Some instructors who wish to organize all their sections this way may schedule their various sections back-to-back in the same classroom so that they are there from, say, 9 until noon -- Monday, Wednesday, and Friday -- to give any student in any section the test when they show up.

This, of course, is not the most ideal system under any circumstances since students will be in various parts of the course in various times. Some students will need the test for Unit 1; others may need the test for Unit 9.

This can be a logictic problem since all these test forms must be brought to class. As one instructor said, "I need a wheelbarrow to move around all the paperwork to operate this course." It's much better, of course, if you can have testing done in a central location that you can control at all times, or some kind of learning center where the instructor can be stationed somewhat permanently.

I have discussed how these learning centers can be established in my Chapter 13, beginning on Page 97. I have also, in that Chapter, described two learning centers -- one at Drake and one in Clayton Junion College -- which I think provide this approach very effectively.

On the subject of proctors and on the basis of my personal contacts, I would estimate that perhaps 60% of those people using an individualized, mastery-learning approach use proctors. It's almost impossible to operate a class of greater than 30 people without some additional aids.

Now, proctors need not be graduate students or even necessarily advanced students. They can be peer proctors from students enrolled in the class.

In Chapters 8 and 9 of my book, I discuss the possible proctor systems that can be used, particularly the rotating, peer-proctor system I've used with a great deal of success.

I think it should be pointed out here that a proctor is not a tutor in the usual sense. In our school, we have three distinct roles for aids: proctors, who are involved with paper grading and indicating remedial sources of the students; peer tutors, who act in a tutorial function; and monitors, whose main function is to keep the logistics of the system operating and some degree of order and discipline in the classroom.

In a college environment, your main need is for proctors. There may be instances where peer tutors are appropriate, but very few instances where monitors may be necessary.

There are several large proctor-managed systems. Two that come to mind are the introductory psychology courses at Western Michigan University under the direction of Dr. Richard Milat, and introductory psychology at Drake University under the direction of Dr. Scott Wood.

Milat runs his course through a series of proctor-supervisors, proctors, and peer proctors.

The proctor-supervisors meet with the instructor once a week, to discuss course operation. They, in turn meet with their proctors -- who are graduate students or who are under-grads who have completed the course -- who do most of the individual checking. Peer proctors are also used as an additional source of labor.

His system has been operating for five years. Scott Wood's at Drakes has also been in operation for four years and has a similar structure, and very good results.

D. Q. *What are the forms involved in this sub-system?*

A. The instructor or the proctor must keep a record sheet on each student. This sheet generally has the student's name, the unit, and the form of the test he has taken. If he re-takes a test, this is also noted on the record sheet.

It is also a good idea to let the student keep track of his progress. We encourage the use of a progress plotter, as shown on Page 84 of Learning is Getting Easier. This not only provides a student with a record of tests he's taken, but also allows him to "evaluate" his progress. We found progress plotters to be the lowest cost, the simplest, and probably the single most effective thing one can do in maintaining student progress motivation.

In a proctor-managed system, where the proctor has the responsibility for 10 to 15 students, he or she can easily spot those who are falling behind and take some additional effort to prod them on.

E. Q. *What communication system is installed to inform other sub-systems: i.e., registrar, bursar, admissions, etc., of the progress of each student through the overall system?*

A. At some institutions, such as Cleveland State, there is a computer-generated, unit test. In this approach all the items are fed into the computer, and the computer randomly generates a test for each student. The student takes the test on some IBM card. This is then processed by the computer, and the student is either passed or failed. In this sense, the computer is acting strictly in the role of a proctor. In one variation of this system, the computer either says "pass" or "see proctor." In the case of "see proctor," the student takes his work over to the proctor to be checked. The proctor gives him individual remediation help.

In Cleveland State and other systems, the overall student progress is printed out each week for the instructor. A similar approach is used in project PLAN, which is marketed by Westinghouse Corporation.

F. Q. *What number of weekly hours are spent with students by the average faculty member?*

A. I use a survey of over 300 instructor's who had used the ILS, individualized-course packages. One of the questions I asked was in regard to how much time they spent with their individualized classroom as compared to their conventional approaches. The majority said it took no more time to operate an individualized class than it did a conventional class. A large number, however,

said it did take more time. A relatively small number said it took less time.

G. Q. *What is the student-teacher load?*

A. This varies depending on how much help the teacher has. With no proctor or assistant, I would say the maximum would be 25 to 30 students. With proctors, Keller says the maximum should be between 100 to 150; but I have known very successful systems being operated with numbers of 400, 500, or even a thousand.

H. Q. *Are there any special pay considerations involved?*

A. Generally, no; but, that assumes that the materials are already prepared. If the instructor must not only teach the class but also structure the curriculum, prepare student guides, and so forth, he should be granted relief time to do this.

I. Q. *How is a professor's role changed as compared to those who are engaged in the lock-step system?*

A. The most obvious change is that the professor goes from an individual who is the major source of information presentation or display to one who is involved in constructional management, evaluation of student performance, and decision-making as to what is next most appropriate for each student.

Typically, lecturing decreases to once a week; then to perhaps once every other week; and then maybe to taped lectures where the instructor spends his time being available to students; to participating in discussion sessions that may arise in class; to working with individual students on projects; to managing the proctors, and so on.

In general, most instructors report that they spend more time interacting with students in an individualized classroom. They get to know their students on a first-name basis. They report also that they enjoy teaching more. This is, I guess, one of the most outstanding features that I've noticed going into an individualized classroom. The instructor enjoys the teaching experience.

Of course, not all instructors like to interact with the students more. And here -- fortunately or unfortunately -- individualized proctor-managed instruction can serve their interests as well.

A few instructors use it as a way to escape or avoid interactions. They let the instructional packages carry the display and even let the proctors do all the work in evaluation. The instructor becomes, then, a pure administrator, reporting grades, keeping track of students, and so forth. This I would say is a minority condition.

II. LEARNING RESOURCE CENTER

A. Q. *What is the system for checking out and returning learning modules from the library?*

A. In most systems using this, I've observed that they usually use an approach similar to that of checking out books or that the modules are available in the learning center and can be taken off the shelf and used only in the learning center -- they may not be removed from the premises. This latter approach is used when the major source of information is in the text-workbook that the student has purchased. The resource center provides parallel modules, enrichment, or depth modules.

B. Q. *Do you have study carrels equipped to handle equipment?*

A. This varies considerably. In our own school we use no carrels at all. We use just tables where maybe three or four students are working independently.

AV is used by many people, but we should be careful not to define individualized or self-paced instruction in terms of the medium employed -- either AV or texts or audio-tape or any other particular medium. Each may have its use, which should be evaluated in terms of learning considerations not by optional preferences of instructors.

C. Q. *Is a record of time spent at carrels kept by the LRC?*

A. We generally keep records of time during the developmental testing phase to determine which units may be too long or too short. Once the material is produced, then the time, daily, is of little importance to this. We generally have a philosophy, "Don't collect data unless you intend to use it in some decision-making process."

D. Q. *How do the LRC personnel know that a student is authorized to check out a certain learning module?*

A. I can't see how this would be much of a problem in most situations unless the use of learning modules is contingent upon mastery, for there may be media involved. The student may contemplate stealing the equipment.

Much more serious situations arise over the question of whether the student is authorized to take a particular test. There are numerous cases where students have taken tests for other students or have had advanced copies of the test and cheated.

These problems can be mitigated somewhat in the proctor systems where the proctors become personally acquainted with their students. In large programs, this becomes difficult and a potential problem.

Cheating, of course, can be decreased somewhat if there are multiple forms of the unit test. The student, then, has to memorize all possible variations. He will probably learn a considerable amount doing this, however. Another way of decreasing the cheating problem is to use the method suggested by Keller: the student must not only pass an objective examination but must also satisfactorily answer two or three oral questions.

E. Q. *Are special personnel required for the LRC and the modules production lab?*

A. LRC personnel may be following the roles of either proctor, monitor, or tutor. To the extent the instruction calls for any one of these three somewhat-independent roles, determines whether or not these special personnel are required.

Monitors are essentially librarians working with the logistics of the system. Proctors need some knowledge of content but more of who the students are and where tests and remediation materials can be found. Tutors need subject matter knowledge.

III. MISCELLANEOUS

A. Q. *If a student is to perform the activities comprising a learning modules away from the campus, how are the hardware requirements monitored?*

A. This question may be answered in several ways. It's possible for students to check out learning packages, which include hardware, and be responsible for that hardware in their control. Another alternative is to have the hardware located in a laboratory space where students can have access to them at any time. They would be doing their independent software studies in any location -- home, under a tree, or in a classroom; but those that require hardware would be done only in a learning-resource-center location or laboratory location.

Here is a question of what are we monitoring: the learning that is taking place or being physically responsible for the physical equipment itself?

If we are evaluating the learning, then conceivably we could do it without evaluating the end process -- work on the hardware. For example, if we are teaching counseling techniques and used an audio-visual display device to teach, we might evaluate the performance in a classroom setting using role playing.

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. The whole question of pre-testing in an interesting one. Obviously, pre-testing -- to determine whether students have the skills necessary to learn from the course -- is valuable. We generally encourage this kind of testing be done.

Many people not only pre-test for determination of entry-level skills, but also for the determination of whether or not the student has already mastered some or part of the instruction to be given. In this case, we are pre-testing primarily for purposes of efficiency; that is, it's more efficient to allow students to by-pass certain units. There is no effectiveness in determination here because the student who takes a redundant unit is no less effective than one who is allowed to by-pass that redundant unit. Of course, there may be a problem of student motivation.

If efficiency is our concern, then we should be sure that, in fact, the system is being run efficiently. If we give the pre-test to a thousand students and find only ten who can by-pass the unit, then we are not really being efficient.

Such an approach may be valuable in areas such as english or mathematics, where students vary considerably and the pre-test is used to place them in the appropriate spot. But in other subject areas -- such as science, where students may have little previous contact with the subject-matter, a pre-test may be actually doing them a disservice, since they are surely to score low on any test of say, electronics or genetics.

In such conditions, we usually allow students to challenge a unit. Thus, rather than having everyone take the pre-test, we say, "Here are the objectives of the unit. If you feel you can already master these objectives, you may request the unit test immediately."

C. Q. *How are the educationally disadvantaged, minority students and "fast" students provided for in your system?*

A. We provide for different learning abilities in a variety of ways. In general, all our educational materials are developed in what we call a multi-level format. This means that we take our unit and break it down into a series of four or five topic areas. Each topic area, then, is developed in a multi-format. The highest level is a textural version or an audio-visual version.

After reading pages of text or listening to a tape or viewing the slides for about five minutes, the student takes a self-administered progress check. These are graded by the students. If the student does satisfactorily, he goes on to the next module. If not, he branches himself down to a more detailed exercise version.

This is our second level. At this level, information is presented, afterwhich the student is asked a question about what he has just learned. These exercises are all confirmed.

There's a second progress check, and students may either go on to the next module or recycle to the exercises again.

It is possible to develop a third or even fourth level, each with a more expanded version of the materials -- giving more examples, giving simpler exercises. Generally, we find at the college level, two levels of development are sufficient for 95% of our students.

For students with bi-lingual problems, we sometimes translate the top level into their basic language and allow them to track along a taped Spanish version with the English-written text.

Fast students are accomodated in a couple of ways: (1) by the unit challenge; (2) by allowing him to go through the top level of the multi-level format; or (3) in cases where we have used off-the-shelf, programmed-instructional materials, we give them a fast track through the frame, that is pointing out those frames

where concepts are introduced and the criteria presented. Thus, we remove a great deal of redundancy in the normal programming format.

In a very real sense, or in the broadest sense, we have students of all ages and all abilities in the same system. For example, in our school, we have kintergardeners, and high school students working in the same room. Students vary in the paths they may take to reach an objective. They may vary in the number of trials necessary to master an objective. They may vary in their present skill levels, and so on. But, the system accounts for this and provides a means for each students, regardless of his or her ability, to progress through the system. If we view education as a learning process, and not a screening process, each student should have the opportunity to learn.

D. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. The best promotional method is word-of-mouth. In those institutions where studetns have been given an opportunity to take either an individualized approach or a conventional approach, there is a definite shift in preference toward the individualized approach.

At Foothill Junior College, introductory psychology students, after ten quarters of implementation, chose individualized psychology ten to one in preference to the conventionally taught course. Similar findings have been known; such as, introductory economics at the University of Oregon. Again, a ten-to-one preference after the course had been in operation for a period of time.

Our surveys have shown that 20% of the students enrolled in an individualized course for the first time do not like the approach. The general reason they give is that they have not learned to manage their own time and that this system requires too much self-management for them. One student put it, "Oh, I get it. From now on we have to do all the work." Interestingly though, when these students were questioned as to whether they would recommend a course like this to their friends, 90% responded in the affirmative.

A few studies indicate that there is a difference in preference for individualization as a function of college. It's generally found that liberal arts students are more favorably disposed toward individualized approaches than are math and science students. It has also been found that there is a shift to the positive direction in most students as a course continues.

I think it is important that students be told ahead of time whether a course is going to be self-paced or not. Instructor attitudes are extremely important, also. I've known of several cases where instructors were forced to use individualized approaches which they personally found distasteful. Their attitudes were soon picked up and mimicked by their students.

I received a letter from a student one time enrolled in such a course who said, "My instructor thinks this whole thing is lousy, and your course has ruined my interest in psychology forever."

In situations where the instructor goes in with a positive attitude, generally speaking, the students are positive, too. There has been some data indicating that the number of students deciding to major in psychology increased when the course was individualized.

E. Q. *Do you require your producers of learning modules to demonstrate competency in their area before employing them in your system?*

A. This is a difficult question to answer. I have found that people who are good at preparing instructional materials in any kind of medium can usually design those materials in any discipline. It's somewhat an analogous situation that a good manager is a good manager no matter what industry he's in. I, for example, wrote a course called, "Easy Steps to Winning Bridge" and never had played a game of bridge in my life.

I've known people to write excellent courses in economics, physics, psychology, and so on, without any previous or very limited background in the area.

This can only work, of course, when the individual writer is working closely with a subject matter specialist. The subject matter specialist does several things that an unfamiliar, untutored writer-doveloper cannot do.

First, he or she can structure the material in a logical sequence. The writer may help in this activity by pointing out alternate ways the information can be presented.

Secondly, the subject matter expert usually has at his or her command a number of examples of a concept which they have found to be valuable in communicating the basic idea.

Third, the subject matter expert can look at the material being presented and determine the accuracy of the content. Whether, in fact, we are telling half-truths and whether or not one's colleagues will be upset with the way something is being expressed.

I have found the best combination to be a group of trained, experienced, developing people used in the team effort with a subject matter specialists. It's generally been my experience that even good subject matter specialists can write reasonably good texts but they are almost universally atrocious at writing exercises or test questions.

There is another related concept in this area. Is it better to develop materials fresh or try to modify off-the-shelf materials?

I, generally, prefer the latter. Even though I have prepared many materials and experienced the design of the instructional materials, I feel there's enough effort involved in teaching class and setting up a management structure without having to also develop all the supporting instructional activities.

What I generally do is take existing texts, film strips, and so forth, indicate on a student guide what sections I think are best handled by those materials, and have the students go to those sections.

Even in our school operation, I discourage having teachers prepare their own instructional materials. I recommend that, for the first time out, people buy existing material if they are available in their subject area. There's enough problems in management of classrooms. These materials can always be abandoned later when you substitute new and better materials or those you may have developed yourself.

F. Q. *Do you have an educational-technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

A. I have mixed feelings about this; I think that the emphasis should be on the management of the classroom, primarily. Secondarily, the preparation of self-contained learning modules should be considered. I know the arguments, both pro and con. One would say, "No one will accept it if it's not developed in-house." I think this is a false assumption. It is true in many cases, but it is not universally true. I've seen over a thousand instructors adopt the ILS pre-packaged materials.

We do have such a package. We do provide an instruction work-shop to the faculty concerning all aspects of individualized instruction. Our first unit, however, is on classroom strategies. Our second unit is on instructional-material preparation. The third unit is on evaluation, validation, and testing, of the designed system. NOTE: This last unit is not mandatory.

IV. EXTRA COLLEGE ASSISTANCE

A. Q. *To what extent are off-the-shelf learning modules, commercially produced used in this system?*

A. As I indicated before, whenever we can use off-the-shelf learning modules, we do so.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

A. We use outside personnel primarily for subject matter expertise since we have in-house people capable of producing materials. But I think this should be done far more than it is. The amount of teacher-generated junk is unbelievable. I'm not saying that all the materials generated by professors are bad, but so much of it is that a lot of money has gone down this particular rat-hole. The sad part is that it could've been avoided with a little outside help. It doesn't take much effort for someone to do a "behavioral edit" of materials, pointing out ways in which it could be strengthened, alternate approaches that may be used, and so on. For one hundred or two hundred dollars or so, editing could be done which could save the college several thousands of dollars of development time.

V. PLANNING YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year; i.e., production of learning packages, developing of systems, etc.*

A. I can list the steps involved in the development, of course. Although it is difficult to specify what time scale is involved.

Step One: ANALYSIS

This involved taking a subject matter apart. If there are hierarchies, they should be generated at this time. It means determining the units and what the contents of the units will be. It means specifying the behaviors that will be taught in each unit, usually in a behavioral objective form or directly into criterion tests. Products, at the completion of this phase, are hierarchy charts, design documents that specify content outline, unit structures, media choices, and so forth; and a tentative criterion test for each unit.

Step Two: PREPARATION OF FIRST DRAFT

If the medium choice involved study guides and a key to tests, a review of texts or materials that are commercially available could be conducted at this time to determine whether they are applicable.

If audio-visuals are involved, a mock-up storyboard is generated.

If a modularized text is to be developed, the first draft of the text is developed.

Step Three: IN-PROCESS TESTING

Materials should be tested as soon as possible. Even audio-visuals can often be simulatedly tested by having students go through scripts and look at crude drawings of the visuals. Generally, in-process testing requires one to three students of average ability to go through the materials to see if, as a result of the experience, they can master the unit test. This in-process testing is probably the most revealing activity one can do.

Generally, you find that you have left out certain important concepts and that you have used language far above what the students can react to. Sentences usually get shorter and english gets more basic. There's generally a requirement to increase the number of examples given in a certain difficult concept, and so on.

The cycle of reviewing in-process testing may be continued as long as the developer wishes. However, there is a point of diminishing returns after a period of time, Many developers are unwilling to ever let go of their product and sometimes it has to be pried from their hands. Ideally, there should be some small group, testing with five to ten students operated in a pilot study, but this is usually impractical.

Step Four: Implementation

More programs fail in implementation than they do in development. The first thing that should be done before implementation is to have the instructor generate for himself a simpler implementation manual. This means, he sits down and specifies what information he needs for each point, how it will be collected, and what his responsibility will be and those of the proctors, and so on.

Another good idea is to sit down and generate a checklist of things to be done. Dr. David Borne, in the University of Utah, has already done some of these. He's prepared a proctors manual and an instructor's manual for individualized classrooms that are pretty good.

VI. BOOKSTORE

A. Q. *What involvement does the bookstore have in the selling of software to students?*

A. I've seen several different plans for bookstore involvement. Where the materials are pre-packaged, in the case of ILS or Westinghouse, the bookstore sells such materials much as they would another book. However, they seldom will buy back used books of the paperback module type.

Some people who adopt ILS materials do not adopt the entire package but may only select two or three of the units and buy them at the unit price. In this case, the bookstore usually has these available and may indicate that the student should buy volumes 1, 7, and 9 or something.

In many cases, people generate their own material, and these materials are then printed at the school and distributed through the school bookstore.

B. Q. *How are prices determined?*

A. Prices are determine by a variety of ways. Obviously, those that are commercially available have their list price. For those that are produced internally, prices could be determined by a combination of what the bookstore needs to operate, usually a 20% margin, consideration of what it costs to print, and the possibility of adding a little extra profit for the development of further course materials.

C. Q. *Does the creator of the module receive royalties?*

A. It depends. For the most part, I have not received any royalties for materials that I have produced. This is because I have taken no real risk. I have been paid a salary during the development of the materials. If an individual has used his or her own resources for the development of the product, then a royalty is reasonable compensation for the risks involved. On the other hand, if there is no risk on the writer's part because he or she was paid for the development of materials, then any consideration or royalty would be more difficult to justify.

The only way to justify royalties in the latter situation is that, conceivably, the incentive of royalties would produce a better product from the author; but in this case, the royalty should be less. In our IBS materials, we did pay a 2½% royalty to subject-matter experts even though they assumed no risk. The writers of the materials received no royalties whatsoever.

VII. EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel and other components?*

A. The primary evaluation of the system comes about by answering the question, "Does it teach?" The unit tests and the course file determine this.

There have been numerous studies comparing individualized PSI courses versus conventional; and, almost universally, they indicate superior learning on the basis of individualized courses.

It's also reasonable to check out the student's attitude toward the course. For this, there are several forms that have been used. I have brought one with me -- my evaluation form.

Dr. Ben Green at the Center for Personalized Instruction, is familiar with someone in Texas who has done quite an extensive analysis of course-effectiveness evaluation. Of course, some of the more usual techniques of evaluating an individualized course, such as the number of contact hours, and so forth, simply do not make any sense. Asking the student, "What do you think of your instructor," when his major contact has been with a proctor, is also worthless.

VIII. COSTS -- BUDGET

A. Q. *What is the ball-park figure for establishing a multi-media production lab -- keeping in mind personnel, equipment, supplies, and student workers needed?*

A. This greatly depends on what you want and I couldn't even begin to give a ball-park figure.

B. Q. *What is the cost of producing a set of learning modules composed of script, workbooks, taped lectures, film slides, and/or film strips, covering approximately 45 to 50 hours of instruction?*

A. This depends, of course, on whether you're talking about a quality course which produces learning, one which is ready for printing, production or publishing. The latter course takes about twice as long. I would estimate that, on the basis of my experience, it would take one professional man-year to create a semester course to the point where it is an effective package. It would take two man-years to put it into publishable form.

Cost wise, I would say that it would cost about $1500 to program a week's work to written form. To do it in audio-visual would cost around $4000. To do it in audio alone, it would cost in the neighborhood of $300 - $500. I might say that with the audio alone, you would probably have to develop some paper materials -- such as unit tests, and so forth -- which would add to the cost of this production.

C. Q. *How many hours of production effort are required to produce one hour of multi-media learning?*

A. Between 50 to 100 hours of development per hour of instruction.

D. Q. *How does the cost effectiveness ratio of your system compare with the cost effectiveness ratio in lock-step systems?*

A. Since going to more individualized approaches usually means increased material costs, the only way one can get a more cost effective approach would be to increase the number of students being served by a given instructor. This can certainly be done with individualized approaches.

High volume courses, such as introductory to psychology, sociology, political science and so forth, can be handled on an individualized basis by one individual. In higher division courses where the enrollments are low, we probably will not get a comparable cost benefit increase.

If we look only at students served and if we also do throw in a benefit analysis -- that is objectives obtained per dollar cost -- we would definitely get a savings here, too. I believe this is so because we're simply going to get in students to learn more for the same dollar.

Cost studies generally indicate about 1/3 savings in cost benefit, which can of course be stated in a variety of ways -- either 1/3 more students obtain the same goals for the same dollars we had before or the students, on the average, obtain 1/3 more goals, or so forth and so on.

IX. LEARNING CENTERS

A. Q. *Dr. Tosti, what do you know about learning centers?*

A. In my book, Learning is Getting Easier, I describe two learning centers, one at Drake University and one at Foothill Junior College. I might also elaborate a little on the structures.

The one at Drake serves 700 students; the one at Foothill serves 350 students.

At the Foothill college, there is a room of approximately 500 square feet. Along the walls are carrels for audio-tapes. Around the center of the room are a number of desk-armed chairs. In the front is a long table where the proctor-supervisors sit.

The proctor-supervisor is a paid aid and is responsible for what goes on in this center. In the case at Foothill, the proctor-supervisor is a recent graduate.

At Drake, there are five proctor-supervisors. They take turns in being on-duty during the opening times of the Center.

Both Centers are open from 9 to 5. In addition, the Drake Center is open three evenings a week.

The Drake operation itself is similar to Foothill's except there are no carrels. They use only desk-chairs where students can come in and study.

In the learning center, there are three things going on: some students are sitting quietly working on their own materials on the text -- which they could do at the Center, at home or out in front of a tree if they wanted to. There are people working on packages that can only be checked out at the center -- such as the audio-tapes. There is still a large group of people doing unit tests and having these unit tests evaluated by a proctor.

Typically a student works on his materials. He or she then walks over to the proctor's desk and asks one of the proctors to administer the unit test. The proctor pulls out of the file one of the three parallel unit tests, randomly, and gives it to the student. The student then sits down in front of the proctor, nearby, and takes the unit test -- marking the answers on a separate sheet. When the unit test is completed, the student goes to the proctor and asks to have the test checked. The proctor sits down with an answer key, and goes over the materials. If the student has scored 90% or better, he is told that he has passed. The unit is checked off on the student's record sheet and entered in the record book. The student is allowed to go on to the next unit.

If the student does not get 90%, he or she can question the proctor on those items missed. Usually, the proctor says, "Well, you said this but what the book says on the material is that." If the student believes that his or her answer should be accepted, he or she can request the proctor-supervisor or the instructor to intervene and make a final decision. This seldom happens, though. Usually there is a discussion; and also usually, two or three other students jump in. It's a great opportunity for an informal, small-group discussion to get started. I've seen it happen many times, and it work very, very well.

If the student accepts the fact that he or she is wrong, as most do on each item, the answer key will indicate where in the textual material the information can be found.

Now, in some systems, the answer key could direct the student to a parallel set of materials. This gets to be expensive, but in a fully developed system, this is what I would prefer to have. If the student didn't get the concept through the primary materials, then I think he should go to a secondary source which would present the same ideas but perhaps in a different medium or a more detailed form. It's not absolutely necessary, as has been indicated at Drake and Foothill; but I think it would be a nice addition to the system.

As I pointed out, a learning center can start with nothing more than a room with two chairs in it. I really believe this is the way to go. I think one should add complexities, such as media and so forth, only when there is a demand for such media and other additions.

X. MASTERY LEARNING

A. Q. *What are your opinions on learning for mastery?'*

A. The whole idea of mastery learning is somewhat confused by the fact that people tend to view it at two different standpoints. Dr. Bloom and other educationally oriented psychologist-educators, usually view mastery contingency as an opportunity to evaluate the students to prescribe remediation for those who don't master.. They play down the incentive value of the mastery contingency.

On the other hand, the PSI people -- like Dr. Keller, the people in behavior modification at Kalamazoo, Western Michigan, and Drake, in fact most of the people in psychology -- view the mastery contingency as an important motivational device and play down the remediational aspects. So, naturally, these people tend to tie in mastery with the grade and see it at that standpoint. They also,I would suspect, feel that if you did not have a grade to go along with the system, it would fall apart.

That is not true. With better students, mastery can, in itself be a powerful motivation device. Of course, adding the grade to it increases its effectiveness. You will see, as you read through the articles I brought, they tend to be very oriented toward the motivational aspect, the reinforcing value of mastery.

If, on the other hand, you run into people, I think like Bob Toft, who see mastery as a remediational kind of thing. Most of the people who write for the Ed-Tech journals, EERA, and things like that, look at the remediational aspects of mastery.

XI. PROCRASTINATION

A. Q. *Procrastination often comes up as a disadvantage of individualized instruction. What are your comments?*

A. Of course procrastination is the leading difficulty in operating any type of a self-scheduling system. In my book, I do suggest a number of ways to get around that. I've also sort of summarized a few of those on the paper entitled, "Overcoming Some Difficulties."

I think the best way to handle this is to anticipate some of these to begin with. Just assume you're going to have some of these problems when you start the program, and then try to implement some of the solutions that I've suggested in the book.

To over come these procrastination problems, the three biggest factors are to, first of all, use some kind of a progress plotter; secondly, try to get students to have an early success; thirdly, impose some time constraints or provide bonuses for early completion.

The bonuses for early completion get a little tricky. At Drake, we tried a number of experiments. I mentioned a girl I had on my staff who was in Drake's program. Her mastery theses dealt with working on various kinds of incentives to reinforce earlier completion. We generally found that those students who needed them the least tended to earn the bonus points for earlier completion. So, that's not a totally satisfactory system. There's still a lot of research to be done in that area.

Let me point another source to you where you might look for articles. The "Journal of Applied Behavioral Analysis" over the last five years has had a number of articles on the Keller system. In fact, they have had so many, they quit accepting any more.

Also, the Center for Personalized Instruction has a newsletter and has back copies available. They also have some papers they sell for around $.50, that are of some interest. I liked the title of one. I've never read it, though. The title is "Learning the Constant, Time the Variable." It's the kind of idea which I think might be spread around rather than to hold time constant and let learning vary within time. The alternative is, of course, to hold learning constant and to let time vary as a function of students. I think even some of the more denser types can see that that's a possibility and could work if you present it that way. I believe that paper was written by an engineer.

XII. THE KELLER SYSTEM

A. Q. *What do you know about the Keller Plan?*

A. If you get Fred Keller or Gil Sherman in, they'll say pretty much the same thing I did. They will emphasize the proctors and the unit tests. They may say that you should insist on 100% mastery rather than 90%. This is somewhat arbitrary, because there's no test that's really that good. What they did, they sort of fudge anyway. They have people retake the test, sort of give them partial credit for answers, and a lot of other ways that sort of fudge that 100% criterion.

The one thing they will say will concern the requirement for oral tests. I don't push that strongly. Fred is very hung up on the idea that there has to be some kind of an oral test given. I can see that as an advantage to the system. I'm just not sure it's really worth it because you need more knowledgeable proctors when you use an oral test. It is more time consuming, too. On the other hand, it is more subjective. It does add a different dimension. The students learn to prepare for an oral test. It may effect the way they'd study. I'm not sure. There's not real data on that. It certainly does cut down on the cheating problems. There's no way you can really know what the oral question is going to be to fake your answers. It's not as easy to do as on a written test.

It's hard for people to be objective in this field, I guess. Everybody's got their own pet way of doing it, and their own pet form of individualized instruction.

You know, I've had people tell me that my system is not individualized because I don't let the students select their own learning objectives. Well, I think that is a form of individualization but only one form of individualization. I think not having that particular component does not make my system any less individualized than somebody elses. In fact, at our elementary school level and the high school level, we do have some parts of the program where students can select their own objectives.

It's just a different dimension. I don't think it's not being individualized because it doesn't have that component.

XIII. RESOURCES

A. Q. *Can you give me some sources for Educational Technology material dealing with individualized instruction?*

A. I think you should get a copy of Dedderline's Cistrain materials. I'll try to get the exact address, but I know it's Sound Systems Incorporated, Palo Alto, California.

Another resource you might look into is the new package that has come out from Bob Mager on what he calls "Criterion Referenced Instruction." It's basically instruction which is programmed on a mastery contingency.

Mager discusses some interesting ideas on the terms of his modular hierarchies and some nice little charts showing the kinds of possibilities the students can have -- options they can take. It's a nice little package he puts together, and he's got it all available in a book form for about $100. I think it's really good. I like it better than the GPT package.

He also runs a workshop for about $300--$400 a head for two-weeks. His address is: Mager Associates, Mountain View, California.

Another source, I think, would be George Gice, at the learning center in McGill University in Montreal. George, a few years back, prepared a course while he was at the University of Michigan on developing independent study materials. It's really aimed right at faculty. The examples come right out of various disciplines. There's a very good unit on preparing criterion tests. I don't know if George distributes this package, but it's a nice piece of work.

You also mentioned the possibility of looking for people to hire. Check the Departments of Instructional Design at Syracuse University, Florida State, and perhaps Indiana to determine if they have any good graduates. I'd say these are the three best schools right now in the country and I'd rank them in that order.

There are a few people coming out of Ed-Psych and Instructional Design at UCLA, also. Another resource you might check into, if you are looking for materials, is the Westinghouse Learning Directory. It's a package, I think, that costs about $100. It's a reference source you may already have in the Library.

It lists, by subject area, everything that's available in packaged form -- either print, film, tape or whatever. You can get that by writing to Westinghouse Learning Corporation, 100 Park Avenue New York.

Another resource is the Hendershot Programmed-Learning Guide published every year by Hendershot. I don't know the address, but I suspect maybe the bookstore could locate it for you. I also suggest that you send a letter off to ILS for several materials in Psych and Spanish and so forth also requesting the teacher's manual for each of those. Their address is: P.O. Box 2399 San Raefel, California.

Westinghouse is the other big publisher of individualized material for the college level. They are located, Westinghouse Learning Press, in Palo Alto, California.

Now, what I have seen of their materials, I'd say that their psychology course is terrible, sort of a pop, not a very good course. I've heard their economics is a bomb, but their biology is pretty good. I've heard mixed reactions toward their English course.

I would recommend that you check out the big convention they are going to have for PSI in March in Southern California. Now, the last one they had down in Washington, they drew something like 800 people. I watched this thing grow from when Keller gave his first paper, (he and I did it together. I did a paper at the same time) when there were 11 people in the audience, up to the 800 people at the Washington convention. This was over a period of about seven years. Another source is a book called, "Learning Packages in America, by Educational Technology Publications.

XIV. INSTRUCTIONAL MANAGEMENT

A. Q. *Bob, what do you mean by instructional management?*

A. I've left a few papers here on what I mean by instructional management. One is that "Taxomony" paper; another one is entitled, "Management by Instruction." They are sort of on the theoritical side, but I think they have real application in individualization. I think that is the finding attributed to individualized instruction. I've often pointed out at visitations that we know a lot about display of information. Most of our research is in that area. We know less about response, what kinds of demands we make on the students, what kinds of participation in the learning activity is best for the students. We do a little bit of work on this, a little bit of development, laboratories, and so forth. But, the area we know least about, and the one I think is one of the most important, is decision-making; that is, how do we determine what a student should experience?

This decision-making is what I call instructional management. It consists of three parts: (1) an assessment of the student's needs, abilities, aspirations, interests, and so forth; (2) a decision based upon assessment, comparisons with that student's profile with the curriculum in some manner; and (3) the initiation of whatever decision is arrived at. These three parts make up instructional management.

Now, obviously, you can have different people involved in different parts of those decisions. I mean you can have some people who will do nothing but assess. Proctors are primarily assessors. They grade papers.

You can have other people involved in decision-making, and still others involved in the implementation.

For example, the student may do his own implementation. Just given a direction of where to go, he can go find it himself, implement his own remedial activity, enrichment activity, or whatever it may be.

The computer is obviously another management medium. It can involve itself in the assessment, the decision, and the iniation.

The one you suggested in your paper here is team management, essentially, where you have two people working together as "twins." They are acting in assessing each other's behavior or needs. They are involved in the decision-making jointly, and in the iniation.

All these are possible and, I think, the systems in the future are going to have some combinations of these -- some self-management, some team management, some instructor management, some computer management, and so forth.

What the best combination is, I don't know. I think that's the direction research is going to really go in the future. What the best strategies are for doing this, I don't know either. I suggested in my book that this is another growing area.

I think you'll see in the book that I bounce around from the theoritical to the applied kind of thing. I have trouble keeping the two straight. I can when I write, not so much when I execute.

XV. LECTURING

A. Q. *What are your views on lecturing?*

A. A lot of people involved in the field are really anti-lecture. Sometimes PSI is pushed off as an alternative to lecture. And, of course, in a real sense, it is.

I don't feel quite as strongly as some people do. I think that there are times when lectures are all right. The one thing I think lectures can be is reinforcing. Under the Keller approach, he has scheduled five to seven lectures per semester. Attendance of the lecture being contingent upon performance. This is a good idea.

I know other people who have tried the lectures once a week and trying to use a lecture as a source of entertainment with no contingency, no attendance requirements. No matter what you do, no matter what kind of a song and dance you have, attendance will drop off to practically nothing. By the end of the semester, as soon as the students determine it has nothing to do with their grade, no matter how entertaining you are, it will drop off.

A lot of people like lectures. They enjoy it. Some students like to attend lectures. They are in a minority. But, there are some.

Interestingly enough, a study was conducted at Eastern Mennonite in Virginia. There, the instructor had free open lectures once a week, with no attendance requirement. He plotted his data on attendance. He was running about 80% attendance on the first week, and it ran down to 15% attendance by the last week. But, when he did a questionnaire, he asked the students, "What would you like to have changed in this course?" The single most frequent answer was the students wanted more lectures. So, this is an interesting concept. They want more lectures, but they won't attend them.

If you are going to have lectures, I think it's a good idea to have live lectures rather than vidio-tapes or audio-tapes. I think one thing comes across from a lecture and that is that the lecturer's enthusiasm for the subject matter. It's sort of a role modeling or role image. If the instructor is truly enthusiastic -- he likes his subject, he's knowledgeable -- then I think there's something gained that's intangible but that can be communicated.

In general, I think, it's better to go to small group discussions. If the instructor likes to have his chance to talk to people, I think it's a good idea. Then, I think that regularly scheduled small group discussions can be the best vehicle for that.

I've known other people who have used small group discussions as part of the additional bonus incentive that students can go to earn part of their grade by attending. This way, it is voluntary.

There are other ways for them to earn their grade. They can do independent study on something else; or they can attend these small group discussions. You get usually a higher quality interaction from those kinds of things, things that the professor really enjoys. The students can get any kind of information out of him that they can.

XVI. SELF-PACING VS. SELF-SCHEDULING

A. Q. *What about self-pacing versus self-scheduling?*

A. The concept of non-lock-step could be interpreted easier as self-pacing, self-scheduling, or a combination of both. In my book, I do make distinction between the two and, I think, a legitimate one.

Self-pacing is an absolute requirement for this business of holding learning constant and varying time.

But the question of self-scheduling is not clear. The fact that students can determine when they begin an activity doesn't lend itself or doesn't lead directly to better learning or worst learning, either one. That's why I think incentives to have them hurry up is a legitimate kind of thing to do. Also, I think putting some time constraints is a legitimate kind of thing to do. It doesn't really interfere with learning.

Yet, interestingly enough, when students ask what they like best about these kinds of systems, they rank the self-scheduling thing number one. So, obviously, it's of interest and of importance to students.

Whether it has any effect on learning under that condition, is secondary. It's something that the students like. So, I really have mixed feelings about it, and I'm not quite sure where we should go with this. I tend to favor a sort of middle ground; that is, self-scheduling within certain blocks of time and certain kinds of incentives contingent upon completion of the activity within that time block, perhaps even some penalties. I'd prefer to avoid those as much as possible, though.

XVII. GRADING SYSTEMS

A. Q. *Please comment of the grading system as it applies to individualized instruction.*

A. In Chapter 14 of my book, I did go into some detail on some aspects concerning grading systems. I have a lot more than this, really, at home. I'll see if I can't put some of them together to send to you.

The one item I don't mention in there, for example, is contract grading. That is where the students can contract for certain types of grades. They can also contract for deliveries, schedules, and so forth. I'm working on that paper now, which I hope to have completed soon. I'll send you a copy as soon as I do. I'm getting it published in "Educational Technology."

CAMDEN COUNTY COLLEGE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. RICHARD HEYDINGER

On Individualized Instruction

November 22, 1974

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Post-Secondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles of the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campus to advise Professor Mario J. Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Professor Richard Heydinger, who visited the College in the role of a consultant on November 22, 1974.

Prof. Heydinger is one of three partners who make up the Formative Evaluation Research Associates (FERA). FERA got its start in the Summer of 1973, when Prof. Heydinger was asked to write the evaluation chapter of Bob Toft's proposal (College IV). When College IV got funded by FIPSE, he recruited three other people to assist in the evaluation effort. FERA

is now a three-person evaluation team that is independent from the University of Michigan, but utilizes its resources quite extensively.

FERA is currently involved in three projects. Along with the evaluation of College IV, FERA is also working with Lee Harrisberger of the University of Texas of the Permian Basin on a project, funded by the Exxon Foundation, which is looking at six, experientally based engineering programs across the country.

FERA's third area of concern can best be called day-to-day consulting. One partner, Peg Talburtt, conducts many workshops on group processing skills, creative risk-taking by women, and etc. Richard Heydinger and John Seeley, the third partner, are involved as consultants for the Educational Testing Service to the United States Air Force. FERA is helping design the evaluation of the Plato system.

FERA, in addition to this last activitiy, is also doing an evaluation of Bear College in Chicago, as part of a FIPSE grant.

The three partners that make up FERA each have a very different set of backgrounds. Richard Heydinger has taught Computer Science for several years and worked as an Associate Director of a small college data processing center. He also maintains an active involvement in computer consulting, presently working most extensively with EDUCOM in Princeton, New Jersey.

John Seeley has a background in international education and was the Director of Peace Corps' New Paul Training Program.

Peg Talburtt has worked in a various set of experiences, as a teacher in Colorado, and as an assistant to the governor in the State of Virginia for affirmative-action projects and other administrative duties.

How This Report Will Be Utilized

The outcomes of the Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least 8 - 10 consultants. The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report that will be presented to H.E.W. in June of 1975.

I. GOALS OF AN EVALUATION

A. Q. *Rick, what are your ideas on why a project should be evaluated?*

A. Perhaps the most frequently stated and obvious reason for an evaluation is to determine whether or not the project has accomplished the objectives that it originally set out to accomplish. In other words, an evaluation should provide summative feedback to both the project organization as well as to the external funding source, as to whether or not the objectives of the project have been met.

Secondly, and more importantly, an evaluation should provide a barometer to the project management of exactly what is happening, a barometer of the evolution of this project. This barometer should be comprehensive in scope and reflect the complexities and intricacies of the organization as it develops. The evaluation should not focus on a single component of the project; but, instead, it should attempt to reflect a systematic prospective of the project. It is only through this comprehensive picture that an evaluation can be an effective management tool.

In providing this barometer, an evaluation team, out of necessity, must collect information either through surveys or interviews; and in so doing, forces the clients to reflect on the day-to-day operation of the project.

My experience has shown that it is often the data collection process which is equally as important as the feeding back of the results. In other words, people are asked to reflect or review why they have done something, or the progress of their project. It forces them to synthesize in a manner which the day-to-day operations did not promote. Thus, an evaluation will result in a synthesis of information that can then be fed back to the client organization, in a way in which the clients themselves simply did not have an opportunity to do.

Thirdly, an evaluation team has the flexibility and freedom to reflect on data from seemingly unrelated areas. The team will try to synthesize those data to bring about an understanding of the project that those intimately involved in its day-to-day operation may not have an opportunity to do. By getting together the pieces of a very complicated puzzle, some new and previously unseen relationships may emerge.

Often times, it is the understanding of these relationships that can provide the solutions to some seemingly unsolvable problems.

Fourthly, an evaluation is also important to measure the unintended consequences of this project; for example, although a project has a carefully charted set of objectives, frequently, the operation has an unintended set of outcomes. It is this unintended set of outcomes which a comprehensive and dynamic evaluation can assess and can provide immediate feedback..

In summary, we can say that there are four outcomes of any evaluation. First the evaluation will provide summative answers to whether or not the project is accomplishing the objectives it originally set out for itself.

Secondly, it provides an on-going barometer of the evolution of the project. It is this kind of management information which is valuable in guiding the project's development.

Thirdly, an evaluation team has the freedom and flexibility to synthesize information and to relate it to the evolution of the project in a way which people involved in the day-to-day operation cannot.

And, finally, an evaluation project can provide feedback on the unintended consequences of a project.

B. Q. *What role should the evaluation play in the context of the project?*

A. It is important for any project manager to determine early in the formation of the project whether the project exists, in fact, for the evaluation or whether the evaluation is simply a documentation of the assessment of the project. More explicity stated, in a laboratory situation, frequently projects are set up to be evaluated to determine the outcomes, to determine their results. The project is set up in a way or in a manner in which it can be comprehensively and carefully evaluated. The evaluation becomes the essential element in this project.

In contrast to this, a project may be set up as an experiment because we think it is a worthwhile idea to pursue. As a spin off of this, we evaluate the outcomes of this project. In this case, the evaluation, although an important part of the project, is not the primary outcome of the experiment. The evaluation provides on-going information and summative results about the project, but it does not govern the operation of the project.

Although the distinctions I have made may seem quite obvious, they have a large impact on the project evolution. To make this point a little clearer, let me give an example.

Certain research methodologies provide for an extensive and more detailed analysis than others may. Similarly, the outcomes, the answers which we can provide from such research -- better yet, the strengths of the answers that we can provide -- are in a large part determined by the research methodology which we can employ. Therefore, if the evaluators are free to set up a research methodology which is the strongest one that they can use, they can get stronger results.

Obviously, this impacts on the project management, the project evolution, and the project operation. Hence, it is important that the project manager determines early whether the evaluation is more important or the project is more important.

Certainly, the dichotomy is not as simple as I have made it out to be. It is more one of balances and degrees.

I think it is important that the evaluation team becomes involved in the project in its design phases, if at all possible. By doing this, the evaluation team is able to comment on what can be evaluated, the ease with which it can be evaluated, and the strengths of the results that will emerge from this evaluation.

If an evaluation team is brought onto the project, after the project has been set up and is on-going, it is more difficult to plug in. It is then more difficult to design an evaluation than if the evaluation team had the freedom to comment on the project before it was implemented.

C. Q. *In a dynamic project environment, how can an evaluation plan, written at the beginning of the project, respond to the evolution of the project over the course of time?*

A. An integral part of any grant proposal is a detailed evaluation plan which spells out not only the philosophies of evaluation but the scope of the evaluation product. This plan should reflect an understanding of the complexities of evaluation, and provide feedback to the environment at appropriate intervals. It should be understood, however, that a good evaluation is dynamic. It is being continually modified to respond to the needs of the environment. As the project evolves, different needs arise; and an evaluation team should be responsive enough to meet these needs.

For example, after the first few weeks of a project, there is frequently a high need demonstrated by the faculty go get some feedback on student-reactions to the new teaching and learning process. An evaluation team should immediately respond to these needs by interviewing students and providing a quick kind of data turn-around that will then provide some information to faculty members to allow them to modify their current operations and perhaps meet a previously unknown need of the students. It is this kind of immediate support reinforcement in constructive criticism that can assist in the construction of a viable project.

Thus, we see that as the project evolves, the evaluation team must stay in constant contact with the client organization to understand its evaluative needs and to continually modify its evaluation plan to meet these needs. It is not to say, however, that the overall design or the summative portions of the evaluation should in any way be scrapped.

D. Q. *To which of the many possible audiences should the evaluation results be directed?*

A. There are three audiences which are always interested in the evaluation -- first, the client organization; second, the funding source; and third, the larger post-secondary educational community is always interested in the outcomes of the experiment. Which of these three audiences should the evaluation results be directed towards?

This is always a fine line for any evaluation team to walk. However, it's my strong feeling that the evaluation results should be directed to the client organization first and foremost. By providing formative feedback in conducting a dynamic evaluation which meets the needs of the client, the needs of the other two audiences will be met. In preparing data feedback reports and/or other forms of feedback, if the needs of the client organization are met, usually the needs of the funding source are met; and the post-secondary community at large can have a thorough understanding of the outcomes, both intended and unintended, of the project.

E. Q. *How are the results of the evaluation communicated to these three audiences?*

A. This perhaps represents one of the largest challenges to any evaluation team. Quite obviously, lengthy research reports may be written and turned over to the institution. Without a doubt, this is the most usual and frequently used method of communicating the results. However, it can be questioned as to whether or not it is the most effective method.

People in the project are too busy with their own activities to read forty to fifty page research reports. Instead, the challenge rests with the evaluation team to come up with relevant, efficient yet thorough ways of communicating their results.

For example, often times a summary brochure is a more efficient way of communicating results. Another example may be a data feedback seminar in which the evaluation team presents the results and allows for a free-flowing discussion of these results.

Although I have never tried (but it intrigues me) the idea of using vidio-tapes, tape cassettes, sound on slides, and other forms of media may be useful in communicating evaluative results. Obviously, this has both time and budgetary implications for the evaluation team. Similar comments may be made about communicating results to the funding source and the larger post-secondary educational community.

In summary, however, it is important to recognize that the challenge rests with the evaluation team to determine an effective way to communicate the results. Effectiveness may be defined in this context as being an understandable, efficient way of presenting the implications of the evaluation findings.

F. Q. *Who determines how the evaluation should be conducted?*

A. Ultimately, the responsibility for the evaluation rests quite obviously, with the evaluation team. However, I feel strongly that the client organization should have input into the design of the evaluation. If an evaluation team is to be responsive and to meet the needs of the project, each of the various constituencies within the project should have some input into the design of the project. Without a doubt, the final decisions must be made by the evaluation team, based on sound research methodologies and overall philosophy for the evaluation. An evaluation that is designed in a vacuum without input from the institution is an evaluation that is missing an important ingredient. And, I would hypothisize that it will not be as comprehensive as the one which uses the clients valuable input in the design process.

G. Q. *What is the difference between a project evaluation and an evaluation for creditation purposes?*

A. Quite obviously, the outcomes of the two are quite different and distinct. You need to understand the differences between an on-going dynamic evaluation and a one-time sight visit of an accreditation team.

The project evaluation is a dynamic, on-going, month-by-month, data-collection process which provides immediate turn-around data not in a judgemental way to the client, but in a helpful, constructive way with constructive criticism. A project evaluation should provide insights into the long term and short range implications of present operational policies. Accredititation visits are a simply yes-or-not type of question-and-answering sessions in which a final judgement is made. This is quite different than the type of evaluation that I feel is so necessary for your project.

II. PROCESS OF EVALUATION

Rick, I would now like to focus on the process of the evaluation. Obviously, this process must reflect the goals of the evaluation as you discussed previously.

The questions on the process of evaluation will be divided into three sub-areas. The first area will answer the question, "How do we get started in the evaluation effort." The second area deals with what we can expect from the on-going evaluation process. The third is concerned with how we wind down an evaluation.

PART A: GETTING STARTED

A. Q. *How should an evaluation team be chosen?*

A. First of all, one must determine whether an outside evaluation team, a team of "objective" outsiders, should be used or whether the evaluation should be performed internally, in house. Certainly, there are advantages and disadvantages to both.

A team of outsiders provides an objective look at the institution and at the project in a way in which a group of insiders, who are part of the day-to-day organizational and political activities of the organization, cannot.

Secondly, an outside evaluation team frequently possesses a breadth of understanding and an objective outlook which is difficult for an inside evaluation team to maintain.

On the other hand, an inside evaluation team, as it gains expertise and understanding of evaluation, becomes a permanent part of the organization, one that can continue to exist long after the outside funding of this project has ended. In other words, the organization is building up an expertise within its own boundaries to do its own evaluation.

After this decision is made, one must still determine what specific evaluation team is to be chosen. This is an extremely difficult decision, for anyone can claim to be an evaluator. I think one of the most important characteristics is to be sure the values of the evaluation team are closely allied to those of the client organization. Similarily, the evaluation team and the client organization must be able to communicate effectively. In a formative, dynamic, on-going evaluation, this communication becomes the essence of meeting the needs of the client and of feeding back the information to the organization.

Beyond this, I might list a number of characteristics which I think are important in any evaluation team. First, I think an evaluator should possess a multi-disciplinery background and understanding of survey research methods, some basic understanding of psychology, and an understanding of good communication techniques. It is necessary to be a good evaluator.

An evaluator should also have an understanding of the larger, post-secondary-educational community. Without this understanding, it is difficult to put the particular project to be evaluated in proper perspective.

The third characteristic would obviously be to have some experience evaluating. It is important that you go out and take a look at other projects that the evaluation team has participated and in their outcomes.

Fourth, I think an evaluation team should probably have a good understanding of problem-solving methods.

There is a fine line between educational consulting and educational evaluations. Frequently, an evaluation team finds itself in the position of being consultants, of providing some suggestions -- I emphasize the word "suggestions"-- not necessarily solutions, but suggestions for the solution of a problem.

An evaluation team should also possess a finely honed set of interpersonal skills. This becomes not only necessary in constructing the evaluation project and understanding the needs of the client, but also is the essence of collecting data through interviews. It is a crucial link in feeding back the information to the participants.

B. Q. *Should we have more than one set of evaluators?*

A. This, too, is a difficult question to answer. There are many different opinions. I think that a project manager should carefully reflect on her/his needs and then determine whether a single evaluation team or some combination of, perhaps, an evaluation team, the case writer, a national advisory board, a set of visitors, forms a more powerful and comprehensive evaluation than any one of these. For example, a multi-disciplinary evaluation team can perform most of the tasks involved with detailed data collection and analysis. On the other hand, the case writer

or person that was charged with writing a case study, can frequently stand back, take a look at the project as it is evolving over the course of time, and write, admittedly, a somewhat impressionistic but, perhaps, a more comprehensive evaluation than an evaluation team that is collecting data on a day-to-day basis and writing extremely detailed and highly analytical reports.

The national advisory board, consisting of highly visible people in the field of post-secondary education, forms an interesting third possibility. This board, acting much like a board of trustees, through a series of perhaps bi-annual visits, can feed back information to the institution. Equally important, this group of people becomes aware of the project because of their expertise in the area and, often times, presents systemic comments which are valuable to a project management. They also provided for visibility to the project in their many travels.

Some combination of these is often-times the most valuable evaluation. If one decides to choose more than one set of evaluators, as I have described to you, it is important to understand the impact that this will have on the institution. Faculty members will have to spend time with each group. Administrators will have to spend time with each group, It may be that students will get the impression that it's a continual line of outside people coming into the institution and asking for information. All of this, of course, impacts on each evaluation.

For example, if a case writer demands interview time with each faculty member and if the evaluation team itself also demands such interview time, the faculty members can become resentful of such intrusions.

Impacting on all this is the fact that any highly visible, first-time project attracts many, many outside visitors. These, too, all take a great deal of time.

Hence, care should be taken in choosing the number of evaluation resources that are going to be used in this project. It is important for each of these evaluators to also coordinate their activities with each other.

I have presented these alternatives to simply make you aware of the range of possibilities for evaluation. Frankly, I think that a well-constructed single evaluation team can go a long way in providing not only a detailed, but a comprehensive outlook of the program. However, I also think that a national board of advisors can do a great deal in providing project visibility, in bringing a national perspective to the project. A national board can provide some valuable input to the project. Not only that, but often times these highly visible people inject an enthusiasm into project operation which otherwise might be absent.

C. Q. *When should the evaluation of this project begin?*

A. If possible, it is best that the evaluation team comment on the design of the project. This allows them to reflect on the type

of evaluation that might be done and to let the project director or proposal writer know the strength of the evaluation which she/he can expect. Thus, if simple modifications to the implementation of the project can be made without in any way impacting on the outcomes of the project, such changes would strengthen the evaluation. Obviously, we would like to incorporate these changes. In other words, if the evaluation team can comment on a project design -- not in such a way that they in fact become another one of the project managers, but can simply comment on the type of evaluation which can be carried on -- a more comprehensive, stronger evaluation will usually be the outcome.

D. Q. *What committment is necessary on the part of the institution in performing an evaluation?*

A. For a comprehensive evaluation to be conducted, it is important that the project or the institution understand that a number of demands will be placed on it by the evaluation team. For example, a detailed record-keeping system for tracing students in their progress through any system, with their background characteristics, is a prerequisite to a good external evaluation.

Obviously, in collecting data from these records, an understanding and a committment by the institution to assist in the evaluation is an absolute necessity.

Secondly, a spirit of cooperation is necessary on the part of the institution. Evaluators, out of necessity, are going to demand time and resources of the institution. Admittedly, an evaluation team has the responsibility of being as unobtrusive as possible; yet, an evaluation team and the institution must work hand-in-hand. If the institution fails to provide cooperation, time, resources, and enthusiasn with the evaluation team, it will not be possible for an external team to conduct an evaluation.

More specifically, it is important, I think, that the institution provide a person who is charged with acting as a liason to the external evaluation team. That person has the responsibility of coordinating any kind of arrangements and committments of the organization to or with the evaluation team.

In summary, the entire institution must be of the opinion that the evaluation is an integral part of the implementation of this project. Without this kind of committment, the best evaluation team cannot provide a comprehensive and thorough evaluation.

E. Q. *What is the interface between the evaluation team and the project management?*

A. This question focuses on the relationships between the evaluation team and the project management. It is important for the institution to designate a single person who has the responsibilities of acting as a liason with the evaluation team. This person can handle any coordination chores, setting up arrangements for visits, answering simple questions about scheduling. Arranging the best

time to visit the campus, providing the academic calendar, and a whole host of very mundane, bureaucratic matters that, at first glance, seem trivial. But experience has shown that they are some of the most important contributions to a smoothly running evaluation.

Secondly, it is my strong belief that a committee representing each of the constituencies of the project should be set up to sit down and meet or to discuss with the evaluation team on a regular basis matters concerning the evaluation plans and the on-going activities. They can also act as a sounding board for design ideas. This evaluation committee can be the focal point for concerns about the evaluation. For example, if the institution has a specific need or would like a specific part of the project evaluated, this need can be brought to the attention of the evaluation team at these committee meetings.

Thirdly, the evaluation committee, in the form which it provides, is an effective way of communicating results that the evaluation team has come up with.

Hence, there are two important components for the interface between the evaluation team and the project. One is a liason person responsible for coordination, and the second is an evaluation committee which can act as a sounding board for research ideas and a form for feedback.

It is important to emphasize that this evaluation effort should contain students, faculty, administrators, and any other constituent group which form important parts of the institution.

F. Q. *How much will an evaluation cost?*

A. This is an extremely difficult question to answer; and although I have been involved in many different evaluation projects, it is very difficult to estimate the amount of time it will require to run a comprehensive evaluation. Nevertheless, the project manager should demand from the evaluation team a detailed budget which projects the amount of time and the dollar resources that are necessary to conduct the evaluation. It is important for the project manager to understand that thorough evaluations involve a great deal of time and, therefore, become quite costly. Although an evaluation team may spend only two days on a campus each month, it's very possible that five or six days could have gone into the design of this visit. For example, if the team has come onto the campus to do some faculty interviewing, a great deal of research design and conceptualization must go on before this interview can take place.

Following the interview, the evaluation team must summarize the data, analyze the results, and perhaps write a report. All this can mean months of work for a simple two or three day visit.

It is usually realistic to assume that a good comprehensive evaluation can be done for between 8 and 10 percent of the total grant budget. Within this figure, it should be understood that it is still necessary to set priorities and to determine which of the many possible evaluative studies are most important. In other words, the evaluation team should lay out a range of possibilities that can be done for the budgeted amount. Working hand-in-hand, the evaluation committee, with the institution in general, should determine the types of studies that should be done and the ones that will best meet the needs of the institution.

In my experiences, I have also learned that one should be conservative in the estimate of how much can be done. This has two immediate benefits. Firstly, an evaluation team should not oversell itself. Research projects always seem to take longer than one thinks. Secondly, by doing this, the evaluation team builds into its schedule the flexibility to meet the needs of the client as they arise. In other words, if a special problem or issue comes up that the client would like researched, the evaluation team has a better possibility of meeting that need when it has not oversold itself and has not taken on too many projects to accomplish.

Obviously, a careful accounting of the evaluation team should be demanded from it. A good set of financial statistics should be provided to the project management by the evaluation team.

PART B: ON-GOING EFFORTS

A. Q. *How do we avoid causing a "threatened" feeling that goes along with evaluation efforts?*

A. No one likes to be judged or be evaluated. In addition, most people do not like questionnaires. What can we say about this? The challenge rests with the evaluation team to be sympathetic and to totally understand the demands of each of the constituency groups within the larger group. For example, faculty time is extremely limited; students have many demands placed on their time. In designing a research or evaluation project, an evaluation team should understand this; nevertheless, the clients must also understand that in order to provide effective and comprehensive evaluation, data must be collected. Questionnairs and interviews will be necessary to collect this information.

All of this, of course, demands time from faculty members, from administrators, and from students. Thus, there must be a willingness on the part of the clients to take the time to provide such input. This willingness and this input is absolutely essential for you to have an effective evaluation.

This is not to say, however, that the evaluation team should not be sympathetic. Many demands, both personal and professional, will be placed on each of the individuals in the organization.

The challenge also rests with the evaluation team to make evaluative activities as interesting as possible. For example, interviews can be fun, can be challenging, can force people to reflect and synthesize information in a way they haven't done before. Innovative ways of gathering data, such as group discussions, journals, and simulations, can also go a long way to eliminating the obtrusiveness of evaluation activities. Thus, in response to this question, the responsibilities lie both with the organization and the evaluation team to make the whole process as unobtrusive as possible and provide the resources necessary to conduct an evaluation.

B. Q. *What criteria can you use for judging an evaluation?*

A. Certainly one of the most important criteria for any evaluation is finding out whether the needs of the organization are being met. In other words, is the evaluation team providing formative information that is useful in understanding the evolution of this project.

Information provided should reflect the complexities of the organization and provide project leaders with an opportunity to reflect on their activities. In addition, the evaluation information should talk about the long term implications of what is currently being done, thus giving project leadership an opportunity to change their course of action.

An evaluation should also comment on the progress towards achieving the objectives of the project. This should be done in an on-going frequently fed-back way.

Frequently, people will say, "I don't understand evaluations." "I don't know statistics." "I can't tell whether my evaluation team is doing a good job."

A comprehensive evaluation can be done using very little statistics. The most important thing is to meet the needs of the client organization, to answer the questions whether or not the project is meeting the goals that it set out to do.

A comprehensive and good evaluation should also talk about the unintended consequences. It should paint a mosaic of the project. I would venture to say that any project leader can evaluate his evaluation team by asking himself whether or not his needs are being met, whether or not the kind of information he is getting relates long term implications of present courses of action, and whether or not this information paints a comprehensive picture of what is going on.

All of this is independent of your knowledge of statistics, evaluation techniques and research methodologies. If a confident "yes" can be answered to these questions, and if an evaluation team, therefore, is meeting your needs, then it seems to me that you can be confident saying, "Yes, our evaluation team is doing a good job." If they are lacking in any of these areas, certainly further investigation and discussion would be necessary.

C. Q. *How will an evaluation impact on the effective management of the project?*

A. Ideally, an evaluation will provide timely information to decision-makers in helping management understand the complex set of inter-relationships involved in the implementation of any project. It should be understood, however, that an evaluation does not necessarily provide answers to many of the problems. Instead, what it may do is highlight relationships.

It should also be understood that, although the data provided may be quite quantative and analytical, it should only form a single part of a much more complicated decision-making process. In other words, project leadership should understand that impressions -- first hand feedback from faculty, students, and other administrators -- can be equally as important as the evaluation reports.

This is not to minimize the importance of evaluation reports, but only to put them in a proper perspective and to understand that many things go into making decisions and in charting new courses, not simply quantative data.

Ideally, evaluation will contribute to the effective management of the project in understanding previously unseen relationships and giving a person a more comprehensive grasp of the project. Evaluation information is only one piece of the mosiac that goes into effective decision-making.

However, an evaluation should contribute significantly to the effective management of the project to understanding previously unrelated variables. Evaluation information should be complementary to the day-to-day experiences of a dean or project leader. Hand-in-hand with first-hand experiences and other types of information, evaluation data will significantly contribute to effective decision-making.

PART C: WINDING DOWN

A. Q. *Once the evaluation team has left, how do I overcome the need for the type of feedback that I will need and which they provided?*

A. Any good evaluation team should have in mind that, eventually, its activities are going to come to an end. The evaluation team should not try to build a dependency by the organization on the evaluation team. It is the responsibility of the evaluation team to wean the organization and to conduct its own evaluation.

In other words, it may be that a new questionnaire to assess student characteristics or to gather feedback from students will be designed for this project. It is the evaluation team's responsibility to design this questionnaire and to modify it after their experiences with the project. This questionnaire should then be turned over to the project with appropriate documentation so that it can be administered by people on the campus and can be analyzed by its own people.

Similarily, if the evaluation team is called on to provide certain skills, such as problem-solving skills, group processing skills, and other types of inputs, care must be taken to design these so that the organization or the clients begin to educate themselves or begin to understand how to apply these skills.

An evaluation team must carefully reflect on the process of its evaluation so that, when its activities are over, the client organization is able to continue with as much of the evaluation as is feasible within the constraints of their own resources.

B. Q. *Once the evaluation is complete, can I expect any future benefits?*

A. I would hope that an evaluation team would leave behind an increasing awareness of the value of evaluation and an understanding of how to use evaluative data in decision-making. Long after the evaluation team has departed the scene, I would hope that administrators will collect some of the same types of information and utilize it in some of the same ways that the evaluation team encouraged.

To accomplish this, it is important that the institution demand from the evaluation team a careful documentation of its activities, how it analyzed the information, why it asked the kinds of questions it did, and why it constructed the evaluation in the way it did. This documentation, perhaps best called methodological documentation, will go a long ways towards allowing internal resources to continue to conduct an evaluation.

Quite obviously, this process should be on-going throughout the course of the evaluation and not simply focused on the final months of the evaluation efforts.

III. WHAT SHOULD BE EVALUATED?

A. Q. *Would you comment on what we should plan to evaluate?*

A. Before talking about specific evaluative areas, it is important to lay out the method in which this question might be answered. Remember that the goals of the evaluation are to present a comprehensive picture of both the intended and unintended consequences of the project. The complexities and the nuances of the project should be represented in the evaluation. Therefore, in choosing what should be evaluated, it is important to continually stand back and ask oneself, "Are we collecting the essence of the project?" "Are the many series of reports or evaluation components which we have laid out really representing the entire picture of this project?"

For example, if one focuses only on the effectiveness of the curriculum, the changing role of the faculty members may be overlooked. If one reflects on the costs of the project, the effectiveness of the curriculum may be overlooked. All of this is to say that the many pieces of an evaluation are highly interdependent, and it is important to understand that each component of the evaluation forms an interdependency with all other components. Only when these are taken together can the entire project be represented.

The suggestions which I am about to provide may be taken as being specific to the Camden County College NLSES program, as presently envisioned.

B. Q. *How do you relate to our goals in your design of the evaluation instrument?*

A. First and foremost, there must be a careful evaluation of goals. Goals and objectives can be taken from the project proposal and from publication brochures and other official documents. Equally important, a careful goals assessment is to be made before the project begins for faculty members and for the project director.

Certainly, one of the first evaluation reports would be a comparison of the project goals, as outlined in the project proposal, compared to the project goals which each of the people personally rate as important. A consistency or match between these is one of the first evaluative commentaries that one can provide on the implementation of a project.

Similarly, the progress towards obtaining these goals is, in a large part, the most important component of any evaluation. Each of the various evaluation reports or components, which I will discuss later in some way contribute to the evaluation of project goals.

C. Q. *How do we evaluate curriculum effectiveness?*

A. Certainly one of the most important components in the NLSES project will be an evaluation of curriculum effectiveness. Curriculum effectiveness can be assessed along a number of different dimensions. One is cognitive growth.

This is a particularly difficult and fuzzy concept to measure given the fact that work on educational outcomes is very much in the incubation stages. Nevertheless, any evaluation must speak to this point.

Secondly, personal reactions to the curriculum must also be collected. These can be student reactions in terms of whether or not the curriculum is meeting the students' needs, how they found the curriculum, and their experiences in interacting with the curriculum.

Another set of reactions can be faculty reactions and, perhaps, those of outside discipline experts. This set of personal reactions form an important part of any kind of curriculum evaluation. Of course, all this information can be analyzed, along discipline lines and along topical lines and compared.

D. Q. *How do we evaluate student development?*

A. This is another important evaluative component. A careful study should be made of students upon entering the non-lock-step educational system. This is in the form of a careful assessment of student characteristics as well as a careful assessment of student needs.

It will be important also to document the growth that a student experiences while in this program. This growth may be defined as both cognative and effective, measuring either one or the other. Measuring one of these without the other is not representing the entire impact of the program.

Finally, the on-going experiences of the students should be documented. These can be done in journal form, and they can reflect the day-to-day feelings of the students. Actually, it's just as valid to use a random sample of students as they work through the NLSES system.

This information can provide many insights in understanding the effectiveness of the NLSES plan. Experience has shown that this data is complementary to the more quantative questionnaire data which can be gathered at the beginning of the year and at the end of the first year. It goes a long way to interpreting and understanding the more quantative questionnaire and survey data which would be collected.

E. Q. *Will you look at the new faculty roles in the evaluation effort?*

A. This is another important area of evaluation. In a new environment, such as NLSES, it will be important to document the emerging faculty role. Faculty will now be in a new position. In essence, with their new activities, the time they spend will be spent in different ways. It will be devoted to different activities. A documentation of this is essential in understanding the NLSES system.

F. Q. *Will you look at the new organizational structure, too?*

A. That is another area for evaluation, the organizational structure or organizational functioning of NLSES. There should be a comprehensive review of the organizational processes of NLSES in decision-making. An understanding of these processes goes a long way to understanding the overall outcomes of the project. Again, the effectiveness of the curriculum, the student development, and the changing faculty role are important components. Without an overall understanding of the organizational structure, an evaluation would be incomplete.

G. Q. *Should our evaluation plan also include monitoring the implementation of NLSES?*

A. Yes, a component termed "the implementation of the innovation," should also be designed; and since the NLSES project will be implemented within the existing departmental structure of Camden County College, you will want to look at how this will impact on the effectiveness of the project. It will be important to place the evolution of this project in the appropriate context of Camden County College. An understanding of Camden County College in general is important in understanding this innovation.

I envision that this report could make a major contribution to understanding the implementation of educational innovations. For example, this could be contrasted to the College IV experiment in the Grand Valley State Colleges in which an entire new college was set up. New faculty were recruited; there was no transistion stage as there will be with NLSES. An understanding of this will contribute to the understanding of educational innovations.

In our talk, I have proposed a possible set of evaluation components that could form the essence of the NLSES evaluation. Undoubtedly, there may be others that are equally as important. When the final proposal is designed, care should be taken to go over that proposal in some detail to make sure that a comprehensive evaluation is undertaken. It is also important to point out that the evaluation must respond to the needs of the project as they leave off. Thus, an evaluation component may literally be added after the project begins. It is only this comprehensive set of components that can reflect the complexities of the entire project. None of these stand alone as THE evaluation. They all must be taken together to form the total evaluation of NLSES.

H. Q. *Rick, another evaluation component which is extremely important to us is an extensive cost-effectiveness analysis. How do you think this can be handled?*

A. Yes, that is one of the major objectives of NLSES, to determine whether or not this system can be more cost-effective than the traditional learning format. I feel that a careful analysis of the developmental, the operating, and the capital costs of the two systems must be undertaken in this evaluation. Such a cost analysis should be a highly visible component of the evaluation. Care must be taken that it is comprehensive and done carefully.

IV. GENERAL COMMENTS

A. Q. *Rick, you have had a great deal of intimacy with the College IV system. Since you have finished answering all the questions on the evaluation plan, I would like to ask you questions concerning the NLSES system which were asked of my other consultants.*

First off, should a student be allowed to register anytime of the year?

A. Rather than answer this question for a specific system, I would just like to make some general comments and reflections, particularly due to my experiences in College IV.

There is a continual trade-off between allowing a student to register with a minimum amount of bureaucratic hassle versus making sure that you have a complete record on the student, a record that's necessary for following up, for counseling, and for a student's personal goal-setting. In other words, if we simply allow students to walk into the office 10:00 on a Friday evening and register, in essence we have provided that student with the maximem amount of flexibility in that the student may have completed two or three modules by the time the registration office or the admissions office opens on Monday morning.

I agree that it's indeed important to "strike while the iron is hot," and to capture the student's enthusiasm as quickly as possible. On the other hand, it is also important, I think, to make sure that the students understands that they are making a serious decision, even if they are only taking one module or one course. Therefore, there's a continual trade-off involved.

Similarily, as we begin to cater to non-traditional students at registration, the registration process should go out to meet the students in their own environment. For example, it may be that we would want to set up a registration booth or whatever in various locations around the county. The College IV Module Mobile is a perfect example of this.

Although there is a continual tension in trade-off here, there are no easy answers. I just think that it is important for the project leadership to understand the dynamics involved

B. Q. *Is there a minimum and maximum number of courses for which a student may register?*

A. Although I won't directly answer this question, I think it is important to understand that, where a student begins in a curriculum may be crucial to that student's success or progress through the system. If a student begins with the mathematics and science sequence and finds that difficult, he may drop-out and never return; where as, if the student, starting with particularly attractive English-sociology modules, met with some immediate success, she/he may be encouraged and may be more self-confident and tackle a more difficult mathematics or science curriculum.

I don't have any hard-and-fast research information on this. We are just now beginning to analyze the student-career paths through the College IV system. I think we are going to find that immediate success in a module is important to continue future success.

As a matter of fact, I do have some hard data on that, I do have some hard data which demonstrates that the longer a student stays away from a system, the more difficult it is for her/him to return. In other words, if a student finds a module particularly difficult, and therefore, continually puts it off, the chances of that student becoming a successful student are much lower than if the student had successfully mastered her/his first module.

In our College IV research, we have termed this "the downward spiral." The unsuccessful students continue to be unsuccessful, and the successful students continue to be successful. As trite as this may seem, on careful reflection, we see that if a student begins in an unsuccessful mode, the chances of her/him escaping that mode are not good.

It should be understood that this research is based upon only the first year of operation and only a small number of students.

C. Q. *How is a professor's role changed as compared to those who are engaged in the lock-step system?*

A. As the evaluation team at College IV, we have done a considerable amount of work on this very question. Rather than go into extreme detail on the findings, I refer you to the report which I have given you and also to the faculty-activities-analysis report, which is a sequal to that report.

Basically, we have found that producing curriculum materials and spending a lot of time in one-to-one contact with students is an extremely demanding environment. Talking to students in a one-to-one situation can be extremely exhausting.

It is also important to note that because the system is now self-paced, a faculty member has to be able to immediately recall bits of information from all pieces of the curriculum. In other words, if you are teaching a course in organic chemistry, you know exactly, what information you have to be ready to "dispense" in tomorrow's

lecture. However, in a self-paced system, a student may walk through the door and demand information on any portion of that organic chemistry course or, for that matter, on any portion of the chemistry curriculum. Therefore, a faculty member has to be able to readily recall information from all parts of the discipline. She/he has to be able to understand the comprehensiveness of the discipline. This is an important role change, and also speaks to an important characteristic of a faculty-hiring policy.

Similarly, because we are now working on a one-to-one basis with student, we have to be able to quickly process the difficulties that a particular student is having with subject matters. Similarily, we deal with a 58-year old housewife a lot differently than you deal with a 17-year old male high school graduate. You are talking to them differently. You are continually changing your mode of operations. All of it is quite exhausting to faculty members.

We have also found in College IV that, in this experimental situation and in its first year of operation, faculty members do not have the time to spend on scholarly activities, reviewing journals, keeping up on their scholarly competency in a way that they would like. This creates some tension.

I'm not going into any more detail. I'd simply like to say that it can be an extremely complicated change, and it may be even more difficult in a NLSES environment where faculty are not changing environments necessarily. They are not changing colleges or organizations; but they are remaining in their home environment, trying to change their mode of operations.

Similarily, it will be interesting to notice or to watch how they deal with this change.

Mario, I just had a thought that I would like to give you now. I know that one of the debated points in the NLSES project is whether to spend an entire year designing curriculum materials, testing them out with a small group of students and in implementing the entire system in the second year. The alternative is to implement the system after an extensive summer workshop.

An off-the-top-of-the-head reaction is that if it is at all possible to secure funding to free up the people to spend a year to design the curriculum -- not necessarily in a vacuum, but working with a small group of students from Camden-- this, to me, seems to be the best way to approach the project. It gives you an opportunity to test the materials in literally a testing environment, one that the students understand is testing.

I think the student should be granted credit for it, but I think the student should also understand when they come in that they will be requested to provide a certain amount of feedback and information in a constructive way about the curriculum materials.

I think the evaluation team could go a long way in setting up a format and a process, maybe even acting as discussion leaders

between the faculty members in a particular discipline and the students that have experienced that discipline.

What I am saying is just an idea. It may be possible for the evaluation team to run a seminar once a month in which the people from accounting get together with a group of accounting students. The evaluation team could act as a discussion leader, asking questions of the students. The students provide the answers. The faculty members then are allowed to comment on it. Faculty members and the students enter into a dialogue with the evaluation team, who makes sure that the important information about experiences or learnings are uncovered. This seems to me to be an important type of testing of this curriculum before it is implemented in a full-blown sense.

Then, the second year of the curriculum in a comprehensive and integrated way, can be implemented; the students external to the college can then, and only then, be attracted to the program. And, it is with some degree of confidence that you can say, "This has been tested."

It is important to understand that the NLSES environment is different than the College IV environment, in which they created an entirely new college. There were certain pressures to open that college and get it going; whereas in this environment, you already have a ready-made group of students to test. You already have a business curriculum and you can slowly phase it in.

I see many, many advantages in that. It gives you an opportunity to not only test the students' reactions, but to also test faculty reactions. You have no idea what the faculty's reactions will be; and if we grab this program with only a summer's worth of work, we may be biting off more than we can chew.

This gradual kind of implementation in the innovation, I think, is an important one.

One other comment on the planning year, which I think is fairly important. I have some reservations about taking a team of discipline experts and media experts and having them produce modules which then can be used off the shelf by other faculty members. I just don't know all the details of how the NLSES system will be implemented, but I know that faculty members will resent using somebody elses' material. This has been demonstrated at College IV. Westinghouse Learning Corporation and other people have produced what may be regarded as fairly decent material. In College IV, people still want to write their own modules. It takes a tremendous amount of time and a tremendous amount of creative energy goes into this. I think it's important to involve the faculty that are going to be teaching this curriculum as much as possible in its design and construction.

There is another comment I want to make. I feel that it's important to understand the tremendous amount of time it takes to "mediaize" courses. The development of instructional objectives, vidiotaping, computer programs, programmed texts, and other forms of

instructional media, demand a tremendous amount of time. Certainly, Mario, with your tremendous experiences in programmed instruction and other forms of media, you are aware of this. I just feel it's important to emphasize that here because it will undoubtedly impact on the project in its evolution.

I would like to, also, just throw out some general ramblings that I have from what I understand about the NLSES project, and it all evolves around the implementation of this idea.

From my first hand experiences and just general awareness of innovation literature, I think in a certain sense, the NLSES project could be an extremely volitable subject at Camden County College. Care must be taken in how NLSES is implemented. Faculty members can be easily threatened by this seemingly stand-alone educational system. It can be viewed as putting them out of jobs. It can be viewed as taking the essence of their teaching and packaging it and putting it on the shelf. All of that can be regarded as being very dehumanizing. This could become an extremely explosive topic; and, therefore, I think it's important to involve the Camden County College faculty or the Business and Data Processing faculty in its design almost from the beginning and keep them up-to-date on what is going on. A little bit of information can go a long way in their understanding what is happening, and it can go a long ways in reducing their fears.

The choice of faculty members to be involved in the project will also be a difficult problem, I believe; but a problem that I think we can get a handle on.

We have seen in the Grand Valley cluster colleges that, in essence, College IV is regarded by some faculty members as being a remedial college, that it is a dumping ground, in a certain sense. It's a place where students can go to get remedial instruction if they cannot keep up with the pace in her/his class.

It is interesting to note that, once the student gets there, and actually go through the curriculum, they don't feel that way at all. But, even the students, upon entering, have sometimes felt that way. I think NLSES should be aware of this kind of opinion that could emerge.

On implementing this innovation, we may want to consider bringing some people onto the campus that can increase faculty members' sensitivities to innovations. In other words -- and let me say that this idea is very much in the incubation stage, so it probably will not come out very well -- faculty members should understand the frustrations in innovation. If we can show them that this frustration and this kind of unknowingness is what's around the corner -- maybe even show them techniques for dealing with them through group processing that allows people to communicate more efficiently and to get at the roots of problems -- I think that the whole implementation effort could go better.

The Creative Problem-Solving Institute, which is in Sunia, Buffalo, gives an example of the technique or the process that the faculty members and the people that are responsible for implementation might be able to utilize. An awareness of such kinds of problem-solving skills may be helpful working through the extremely complex issues that are going to face any implementation effort.

Now, this is only a suggestion. Obviously, it deserves a lot more reflection and careful thought. It is these kinds of things, I think, which may make the implementation go a little more smoothly.

I would like to move on to another area, which is tangently related but bears on the evaluation.

I notice that, on the NLSES proposal that was submitted last year to FIPSE, you mentioned the comparison of students by using grade-point averages to determine how effective the curriculum is. But, at the same time, we are talking about a mastery system in which all grades are "A"s.

I think it is important to understand that one of the real difficulties in comparing this system to your conventional one is that the outcomes are not measured in the same way. You don't have a grade point average in a mastery system. Everybody will have a grade point average of 4.0. Now, if you are going to use grades in the other system, you have a problem.

Now, we are talking about a time measure. "How long it takes the student to get through the curriculum in both systems," is some kind of comparable data that is different from the grade-point average. You just can't equate the two of them and I think it's important to understand that. It's just a little point, but I think it's worth highlighting.

Another point that's sort of interesting along this whole notion of student self-pacing is something that we are beginning to discover at College IV. We knew about it a long time, and probably Bob Toft has commented on it, too. This system is a student-driven model. By that I mean that the students determine how much credit is generated. You know, undoubtedly, they also determine that in the more traditional system; however, in the lock-step system, you know how much credit you are going to generate the day they register. You don't know that in a self-paced system.

A student may literally complete her/his courses three days, three months, or three years from now; and so you continually have students in a pipe line . It's important to understand that the flow through this pipe line is student-driven and that faculty members cannot control how "large" their classes will be. So, in many ways, the administration of the college is losing an important kind of control variable that it used to have.

This is just a little aside, but it is an important dynamic in understanding self-pace instruction, both from an administrative standpoint as well as from an educational one.

CAMDEN COUNTY COLLECE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. JAMES HAMMONS

On Individualized Instruction

December 12 - 13, 1974

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Post-Secondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campus to advise Professor Mario J. Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Dr. James O. Hammons, who visited the College in the role of a consultant on December 12, 1974.

Dr. Hammons is presently a staff member of the Center for the Study of Higher Education at The Pennsylvania State University, where his responsibilities are divided between graduate teaching and staff development activities with the two-year colleges of Pennsylvania. His teaching responsibilities include a course entitled, "College Teaching," another

entitled, "The Community-Junior College," and various seminars on topics ranging from "Management-by-Objectives" to "Instructional Design."

Prior to joining the Center staff, he was a Program Associate of the Junior and Community College Division of the National Laboratory for Higher Education, with major responsibilities for developing training materials and conducting training for faculty members, administrators and educational development officers in community colleges.

Before affiliating with the National Laboratory for Higher Education, Dr. Hammons spent four years as Dean of the College at Burlington County College, New Jersey, generally acknowledged to be one of the most innovative community colleges in the country. Other experiences include Assistant Campus Director and Acting Campus Director of the South Campus of Miami-Dade Junior College, Florida, two years in student personnel work at a vocational technical institute and university work in both counseling and housing. In addition, he has taught at both the community college and university level, as well as in the military.

He has worked, spoken, or served as a consultant on 50 two- and four-year college campuses in 20 states and Canada on a variety of topics ranging from faculty development to management-by-objectives to learning resources to facility planning.

He has published several articles on equally varying topics and is presently writing a book dealing with case studies of successful faculty innovations in instruction.

Dr. Hammons has a B.S. with a double major in mathematics and political science from Northwestern State University of Louisiana, an

M.S. in College Student Personnel from Southern Illinois University, and a Ph.D. from the University of Texas in Community College Administration.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least 8 - 10 consultants. The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report, that will be presented to H.E.W. in June of 1975.

INTRODUCTORY REMARKS

A. Q. *Would you like to preface your remarks and responses to my questions on individualized instruction with a few general comments?*

A. First of all, I will be responding to your questions only partially from my experiences at Burlington County College.

The Burlington experiment -- and that's precisely what it was, an experiment -- was accomplished in the late 60's when very little was known about individualized instruction, particularly at the collegiate level. A number of early decisions that I made at the institution are not decisions that I would make if I were doing it again at this time.

Consequently, much of what I say will be based on my experiences since leaving Burlington, at some 50 different two and four year colleges in some 20 different states and Canada.

On questions that are rather specific, such as the ones on admissions and registration and the bursar, I will tend to respond primarily from the Burlington viewpoint. However, on the more general questions, which really get at the heart of the matter -- for example, questions dealing with learning modules, production of learning packages, etc. -- I will speak generally.

I. ADMISSIONS

A. Q. *How does a student apply for admissions to your school?*

A. Admissions to Burlington County College is quite similar to admissions procedures at other community colleges. There is an application form; and there are a couple of other requirements, primarily a health form and, for students who are under the age of 21, the scores of the American College Test. Application forms can be mailed to the students or can be picked up in person.

B. Q. *What are the admissions requirements?*

A. The admissions requirements at Burlington are not that different from admissions requirements of other institutions. Essentially, they consist of high school graduation or completion of the G.E.D. Students under the age of 21 years are required to submit scores on the A.C.T. Test. The A.C.T. scores, I should add, are not used for purposes of determining whether a student should be admitted but are used in placing students within courses appropriate to their background.

C. Q. *What are the record keeping forms and procedures used in the admissions sub-system?*

A. I'm really not that familiar with the details and the procedures used after the application forms come in; and I'm not sure that's particularly important to this point, since these are matters having to do with administrative procedures for getting students enrolled in the college. And, although there's a variety of methods used around the country, they all seem to be reasonably effective in accomplishing the same end result.

I would make the comment that the procedures at Burlington are, perhaps, a bit better than most of the colleges because of a rather elaborate management information system. This has necessitated a great deal of attention being given to the input data and, as a consequence, has meant that the admissions application form was designed to meet machine requirements.

D. Q. *What the student leaves the admission sub-system, what proof does he carry with him that he has been admitted to your school?*

A. A student receives a letter indicating that he has been admitted to the institution. I suspect that these letters are filed away, as are most other letters of this type, and are not used again. Certainly, there is not a reason for the student to present a letter of this type when he reports to the college. Rather, what has happened is that the information regarding his acceptance has been communicated to the counselor. He has also been placed on a computer run, which lists the students admitted; and at the time he comes to register, the computer would verify his admittance before allowing him to register.

II. REGISTRATION

A. Q. *Where does the student get advice about scheduling, curriculum and courses?*

A. Information of this type comes from a variety of sources. The primary sources of information are printed documents, such as the catalog and registration procedures. These, then, are interpreted to the student by either a counselor or faculty advisor or both.

At Burlington, each student is assigned to a counselor and to a faculty advisor. Students who enter with poor high school grades or low ACT scores are initially advised by a counselor. Those students who enroll in career courses are always advised jointly by a faculty advisor and a counselor.

B. Q. *How does the registrar know that the student has been authorized to enter classes for which he is registering?*

A. The signature of a faculty member or a counselor on an advisor form is the primary vehicle used to insure that a student meets the necessary prerequisites for a course. Again, as is the case is most other community colleges, this is not well monitored and students quite often find themselves in courses for which their backgrounds are not appropriate.

Although not used at Burlington, a technique used at one other institution I was associated with; namely, Miami-Dade Community College, required that in certain courses, students were required to get a signature of a faculty member before being able to enroll in a course. My personal opinion regarding this practice is that it's unnecessary. It presents an unnecessary hurdle to the students. There are other more feasible ways of achieving the same objectives.

C. Q. *What are the forms and record keeping procedures involved in the registration sub-system?*

A. I was intimately involved in developing the initial forms and procedures for the registration system. However, over the years, I delegated this to other people and eventually lost touch with it.

I would suspect that the forms and record-keeping procedures are somewhat similar to those used in other colleges, although the registration procedures were a bit different at Burlington. Consequently, this difference was reflected in some of the forms and procedures.

At Burlington, the registration (or the schedule of courses) was not something pre-planned in advance irregardless of student need. Rather, an attempt was made to insure that the schedule of courses developed for each term was a direct reflection of the needs and desires of students.

Students were advised at the beginning of their pre-registration period of those courses that would not be offered. Then, in cooperation with their faculty advisor or counselor, they developed a schedule of proposed courses with necessary alternatives for their program at that particular point in time.

This information was collected from all the students who pre-registered and fed into a computer, which printed out a list of courses and a frequency count. There was also a conflict analysis, which indicated that, for example, if 100 students indicated that they needed to enroll in English 101, 50 of these students also might be taking Business 101. Consequently, if we scheduled those two courses at the same time, we could be assured of a minimum of 50 conflicts.

Using this data base, we were then able to develop the registration schedule which would avoid most conflicts. This information was then used to formulate a schedule which was fed back into the computer. At this time, the computer matched the requests from students against the schedule and actually developed their own schedule for them.

I should say that this program was used for those students who chose to register early. Other students came in at the regular registration time, which followed much the same procedures as in most colleges. However, they had a greatly reduced choice of courses.

D. Q. *What proof does the student have upon leaving the registration system that he has been: 1. admitted to school; and 2. gone through the registration system?*

A. The student has a copy of his schedule printed by the computer. This is the only thing that he needs. This schedule reflects his courses, his room numbers, and times. If he has not been admitted or if he has not paid, he would not be given this form.

E. Q. *Can a student register at anytime during the year?*

A. Let me speak first in terms of Burlington. When Burlington was first being started, there were the president, myself, and a couple of secretaries. In terms of long-range planning, it was always our intent to work toward an instructional system which

would allow the student to enter at anytime, to complete the requirements of the courses at his own pace, and to complete the courses at anytime that was convenient to him. This, of course, necessitated the individualization of courses which meant a minimum requirement for group-oriented instruction and a maximum requirement for the development of self-instructional modules.

I left Burlington at the end of its third year of operation. At that time, there were very few courses in which the curriculum development had reached the point where it would be possible for students to enroll at anytime. The ones that I can recall are the Reading Program (probably the furthest along), followed by both the Physical Science courses, a developmental English course, a basic or technical math course, and a number of the physical educational courses, such as tennis and swimming.

I should indicate that, while it was possible for a person to register in these courses at anytime, in actual practice, it happened but rarely. There are a number of reasons for this. One is that procedures had not been developed to accomodate this. Secondly, it was not generally known that this was possible. We had chosen not to advertise this fact since there were so few courses for which this was appropriate. The counselors were aware of it and made use of it from time to time.

Let me make a few comments about this practice in general. In my travels throughout the country, I find very few institutions which have made much progress in what would be called "continuous registration." The most outstanding example of an institution which has done this is Nebraska Technical Institute. There a student is actually able to enroll in any course, any day. This is a rather unusual institution. A number of factors have made it possible for this institution to reach this point. One of the most important is the strong leadership of its president. Another is the fact that it was not dependent upon straight funding for support. Consequently, it was not necessary to deal with such sticky problems as reporting enrollments on a given date in a term to state offices in order to receive state tuition reimbursement.

The Canadian colleges (in the province of Ontario) have made a great deal of progress in this area in what might be called "Career Occupation" areas. The impetus for this was a decision from their state level office of education. This decision mandated (I think two to three years ago) that they would, in effect, be able to enroll persons in these particular courses every week or two, which meant that they had to revise their courses to facilitate this.

There are a number of courses in institutions around the country where this has been possible, but I know of no other institutions where this is feasible on a college-wide basis.

The notion of a student being able to register at anytime during the year for even one course sounds great in theory, but presents some substantial problems in implementation. The least significant

of these, in my opinion, has to do with the problem of dealing with state reports and the internal procedures of the institution which are necessary to accomplish this. By far, the most significant problem with this is the various structures of most courses which require students to learn units one and two before proceeding to unit three.

In order for a student to enroll in a course at any point in time, it is necessary for the resources of all the units in the course to be available to him at any point in time. Obviously, as in the case of certain science courses where laboratory set-ups, etc., are required, it is just not feasible to have the experiments for the entire course set-up constantly throughout the year. Consequently, the science courses are arranged so that the students progress through them unit-by-unit together.

There are variations of this found in some institutions where there might be three different experiments set up at one time: the experiment that the majority of the students are on at the present time; the experiment which immediately preceded that; and the experiment following the first. Facilitating this type of arrangement requires the availability of personnel to issue materials, very different kinds of record keeping on the part of the faculty member, and knowing where each student is at any given point in the course. Most faculty members are simply unable to handle the administrative details that are necessary to implement this approach. And, most institutions are not able to provide the kind of support personnel that would be needed. To my way of thinking, it is more important that a student be able to finish a course at different times than begin a course. This occurred quite often in perhaps 50% of the courses.

F. Q. *Is there a minimum and maximum number of courses for which a student may register?*

A. There is certainly no minimum number of courses. The maximum number of credits is approximately 18 semester hours. There were a few exceptions, however, where a student carried 21 credits and I vaguely recall one student who somehow managed to get 26 or 27 credits in one term. Part of these, I should add, were accomplished by the vehicle of testing out of the courses.

One of the problems involved in individualized instruction is related to this. Specifically, how do you handle the question of student tuition when students would conceivably be able to enroll in 12 credits, complete those at mid-term, and then enroll in another 12 credits?

The most satisfactory solution to this that several institutions have found is to change their fee schedule so that students pay so much per course. This is based on the philosophy that a student should be willing to pay per credit hour. Also, since faculty time is involved in any student learning effort (and faculty salaries must be paid), there should be some provision whereby a minimum relationship between student credit hours earned and fees paid would exist. This procedure is reflected in the policies of institution, where in order for students to take credit-by-examination tests, they are required to pay a fee.

III. BURSAR

A. Q. *How does the bursar know that the student who is attempting to pay for courses has been fully admitted and registered?*

A. The articulation between the registrar's office and the bursar's office is critical. At Burlington, this was handled by the computer, so this did not present any particular problem.

The bursar's office was involved in the development of the registration system and insured that his office received whatever information would be necessary.

B. Q. *What forms are involved?*

A. I don't believe I can respond to this. I know that much of it was accomplished in the computer, but I never really got that involved in the details to that extent.

C. Q. *What is the tuition amount charged for each course or module?*

A. The tuition at Burlington was based on the full-time or part-time distinction. Students taking 12 or more credits (full-time) paid a flat rate regardless of whether he enrolled in 12 credits or 18. Students enrolling for fewer than 12 credits, however, were charged on a per-credit basis. The key here was to insure that a student who carried 12 credits on a part-time basis would pay essentially the same fee as the full-time student who carried 12 or more credits.

The fee, at best I can recall, was $150 per term for 12 or more credits and $12 per credit hour for part-time students. I am sure that this has changed since I left. Other colleges I have worked with have actually developed a fee schedule for portions of courses consisting of several modules.

D. Q. *What form (or proof) does the student have that he has paid for a specific module?*

A. Again, the student's registration slip, printed by the computer, was the major proof. When students enrolled in courses at other than the beginning of the term, there was a separate form used which indicated to the faculty member that the student had paid and was cleared to take that course.

Also, when a student goes to an independent study area to check out a module, he shows his ID card and is entered into log which eventually goes into a computer. However, no attempt is made to insure that students are properly signed up for a course before allowing them to checkout a mediated self-instructional module no more than we would attempt to control books checked out of the library -- if he has an ID card, he gets it!

IV. FACULTY

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. At Burlington, the student was not required to demonstrate any proof that he belonged there. Rather, each faculty member was furnished with a computerized list of those students who had enrolled in his course.

The normal procedure was for the faculty member to call the roll. For those persons in the room whose names were not on the list, the faculty member checked to see if they had an admissions slip from the registrar. If not, they were sent to the registrar's office to resolve the difficulty.

B. Q. *What sort of orientation does the mentor give the entering student?*

A. I assume the question deals with the orientation to the procedures of the course. This is a most critical matter and one on which I've recently written an article entitled, "Students Can Be Oriented to a Systems Approach," which will appear in the Personnel and Guidance Journal sometime this next spring.

We found, through trial and error at Burlington, that we could not leave the matter of student orientation to systems up to each individual instructor. The reason was quite simple: each instructor had his/her own opinion regarding what was supposed to be happening. They each communicated their own affective feelings and attitudes toward such systems and, in many instances, these were not all together in harmony with the direction and goals of the institution.

Based on a number of instances in which students demonstrated that they were not aware of their role in an institution devoted to a systematic approach to instruction, it was decided in my last year to put together a student orientation program that would be college-wide. It was done my last year and proved to be a highly successful program. Essentially this program focused on approximately three areas. One of these was an orientation to the community college, in which we dealt with such things as the large number of community colleges, the fact that every state had them; that in California, for instance, some 85% of the high school graduates who went on to college enrolled in the community colleges; and that in New Jersey, better than 50% of the students going on to college within the state were enrolling in community colleges. This area was an attempt to cause a student to understand the community college better and to realize that the fact that he was attending a community college did not mean that he was in the minority of students. We also included such things as the success rate in students coming out of a community college when they transferred to four-year colleges, and the income levels they were able to earn as a result of only two years of college.

The second emphasis of the Student Orientation Program was on the particularly singular characteristics of Burlington County College, in which we pointed out some of the ways in which we were unique. We also described in some detail the student body at the college so that students were made to realize that there will be people in their classes who had been out of college for some years as well as persons who had just graduated from high school. Consequently, the range of ability would vary from the person who was quite able to compete with students at Harvard all the way down to the student who was reading at the sixth-grade level.

The third aspect of our Orientation Program, and the one which I would suspect would be most relevant to this project, dealt with orienting the student to the uniqueness of the instructional approach used at the college. Here, as best I can recall, we focused on the differences in his role, the differences in the role of the faculty member, and the various vocabulary items that he would be exposed to.

For example, under the student's role, we pointed out that whereas in the traditional system the student spent a great deal of effort and energy trying to "psych-out" the instructor to determine better what questions would be asked on tests, at Burlington, he need not spend time on this. Each faculty member was expected to write objectives for their course and the test would be based on those objectives.

In terms of the role of the faculty member, we indicated that, whereas in a conventional approach to instruction the faculty member's role was essentially that of a performer or a disseminator of information, in the approach to instruction used at Burlington, the role of the faculty member was that of a manager of student learning. This implied that the faculty member was responsible for writing objectives, developing test items related to his objectives, and determining and/or developing instructional procedures which would allow students to accomplish those objectives. In the system at Burlington, the faculty member's role was not that of getting in front of a class and lecturing, but rather to work intimately with small groups of students, or with individual students who were experiencing difficulty, and to help them master the objectives of the course.

In addition, students were oriented to the course documents that were used. For example, every student in every course at Burlington received a course syllabus. This was not something that was filed away in the department chairman's desk. A student syllabus for the orientation program was developed and, through this device,

of these, in my opinion, has to do with the problem of dealing with state reports and the internal procedures of the institution which are necessary to accomplish this. By far, the most significant problem with this is the various structures of most courses which require students to learn units one and two before proceeding to unit three.

In order for a student to enroll in a course at any point in time, it is necessary for the resources of all the units in the course to be available to him at any point in time. Obviously, as in the case of certain science courses where laboratory set-ups, etc., are required, it is just not feasible to have the experiments for the entire course set-up constantly throughout the year. Consequently, the science courses are arranged so that the students progress through them unit-by-unit together.

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One of the problems involved in individualized instruction is related to this. Specifically, how do you handle the question of student tuition when students would conceivably be able to enroll in 12 credits, complete those at mid-term, and then enroll in another 12 credits?

The most satisfactory solution to this that several institutions have found is to change their fee schedule so that students pay so much per course. This is based on the philosophy that a student should be willing to pay per credit hour. Also, since faculty time is involved in any student learning effort (and faculty salaries must be paid), there should be some provision whereby a minimum relationship between student credit hours earned and fees paid would exist. This procedure is reflected in the policies of institution, where in order for students to take credit-by-examination tests, they are required to pay a fee.

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D. Q. *What form (or proof) does the student have that he has paid for a specific module?*

A. Again, the student's registration slip, printed by the computer, was the major proof. When students enrolled in courses at other than the beginning of the term, there was a separate form used which indicated to the faculty member that the student had paid and was cleared to take that course.

Also, when a student goes to an independent study area to check out a module, he shows his ID card and is entered into log which eventually goes into a computer. However, no attempt is made to insure that students are properly signed up for a course before allowing them to checkout a mediated self-instructional module -- no more than we would attempt to control books checked out of the library -- if he has an ID card, he gets it!

a student was made to realize what it looked like and what elements should be included.

The second document students were familiarized with was called the "Learning Packet," which was an outline prepared for each unit of each course containing the objectives for that unit, the learning resources or activities related to each objective, and a number of statements regarding special instructions to the student. In some instances, a sample post-test covering the objectives was included. Also included in these packets were discussions of the grading system.

I might add that if you are interested in this, I might be able to furnish you with a copy of the script used in the student orientation and a copy of the article itself.

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, the completion of modules, and the issuance of the next sequential module?*

A. In order, let me respond to these. Learning modules were issued in a variety of ways. Initially, they were passed out by the instructors in classes. Later, due to the tremendous volume of paper work this created and the fact that offices soon began to look like paper storage areas, the modules were placed in the bookstore and students could purchase them there. Later, this was changed to a system where students picked up their modules from one of the six individualized learning centers in the college.

As I travel around the country, I notice a variety of ways in which this problem is handled, most of which are some combination of the things which I mentioned previously.

The second question deals with the performance of the activities involved in the modules. Each module or "Learning Packet," as they were called at Burlington, contained a list of the activities that were necessary for the accomplishment or achievement of each objective, any special instructions regarding the procurement of resources necessary, or where they must go. For example, if an objective required a student to perform a particular experiment, information was included regarding where the materials necessary to accomplish that experiment would be available.

The inclusion of mastery testing was not handled well at Burlington. As practiced there, mastery tests were essentially of one type, and these were for grade purposes. The tests were kept at a designated test center and eventually were put on a computer. Therefore, a student came into the test center, identified himself by showing an ID card, and indicated the particular test he was ready to take. This was pulled either from a file, or a computer generated a test for the student from an already established Test Item Bank.

The system was handled poorly at Burlington. I should clarify that by saying that the procedures that had been worked out were very good, but I think the tests were being used improperly. Ideally, for each learning module, there should be a formative examination; that is, a self-test or a test that would reflect the objectives of the unit. The student would take this test, not for grading purposes, but rather to indicate to the student the extent to which he had mastered the objectives of the course. Then, ideally, after a student had completed several units and had successfully passed a number of these self-tests, there would be a summative or "for real" test, in which the results would count toward grades. Unfortunately, however, this subtle distinction was not recognized by the majority of the faculty at Burlington, with the result being students' abuse of the system. For example, I like to tell the story of how, while walking through the halls, I was almost knocked over by a student. Since it was quite unusual to see students running in the building (we didn't have many fires), I decided to follow him and see what had motivated him to move so fast. I found the student went into the test center, identified himself, and sat down and took a test. I couldn't understand what the rush was, so I stayed around. After he took the test, the student ran back down stairs to one of the learning centers, again identified himself, checked out another learning module, and sat down and began working through it.

That's when I realized what was happening. The student was obviously behind. In an attempt to catch up, he was working through the modules very quickly and then running up-stairs to take the test for grading purposes before he forgot the information.

Now, to me, this meant that the student had missed the entire purpose of the system. However, the faculty member had encouraged this situation. Had he indicated that the student should work through the module and then take a self-test which would not be for grading purposes, this would have encouraged the student to spend more time on learning rather than on committing facts to memory. The check on the system would be the periodic test given whenever a student has completed a number of modules. This latter test would be given for grading purposes.

Thus, the student who had cheated himself by not taking this self-test at the end of each unit, or by faking it, or by not being honest with his responses would do poorly on the test covering several units.

As the modules were completed, provisions were made for the student to demonstrate performance before moving on to the next unit.

The issuance of the next sequential module varied in some instances. There were courses in which faculty members told students to go to the learning center when they had finished one particular module and passed the post-test on that. They would then be issued the next module. In other courses, all modules were given to the students at the beginning of the course.

I have experimented with this myself and have more or less concluded that for undergraduate courses, you are much better off to give the student a syllabus which presents or provides an overview of the entire course and then issue the individual modules within the course one at a time. However, in graduate courses, I have found that grad students prefer to be given the whole thing at the beginning of the term, which, I guess, is not unexpected.

D. Q. *What are the forms involved in this sub-system?*

A. I'm not sure what you mean by this. The examinations are kept by the faculty member primarily in those cases where there is a small course or small classes. However, in those instances in which there are large classes or multiple classes, the test center has been used and the tests actually are kept at the test center or kept in the computer.

Perhaps I should make a few comments regarding the feedback to the instructor from the results of the test. The computer program was written so that it not only analyzed the test from the viewpoint of which students missed or which questions were missed most often by the majority of the students, but also included a detailed report for each student. The ideal situation would be that each Monday morning the faculty member would find on his desk a computerized print-out showing the results of students' tests the preceeding week and an item analysis of the questions. I think this system is actually in effect at Burlington, although I don't think that the majority of faculty members are using it as effectively as they might.

I notice that Dr. Toft makes reference to the revision data sheets for each unit. In a large part, the modules at Burlington did not include a one or two page sheet which asked the students to critique the unit. As a result, revision of the materials was not accomplished for the right reasons. Ideally, the revision data sheet would be arranged so that the faculty member would gather information regarding which part or parts of his module was not as effective as it should be. Then he would revise those parts, based on student feedback. In the absence of this, I found a tendancy for faculty members to revise materials for revision sake. That is, they would go in and revise materials which had been working perfectly well previously, meanwhile neglecting other portions of their courses which sorely needed attention.

E. Q. *What communication system is installed to inform other sub-systems; i.e., registrar, computer, administration, etc., of the progress of each student through the overall system?*

A. At Burlington, the concern was to inform the individual instructor of the progress of each student through his course. We were not so concerned with charting the progress of each student through the institution. The device used for this, again, was one of two forms. The first form was a chart arrangement which showed the objectives of the course and the names of each student on different axes. As the student completed the objectives, either the student, his instructional assistant, or the faculty member would mark his progress on this form. Thus, it was possible at any time to ascertain where a given student was in the course. The intent was to place this system on a computer. I don't know if this has happened or not.

F. Q. *What number of weekly hours are spent with students by the average faculty member?*

A. The answer to this question deals essentially with the faculty load system utilized at Burlington. When the college initially opened, we knew that we would be somewhat traditional in our first year since we were operating at a high school and since faculty members had not had the opportunity to develop individualized materials, nor did they know very much about this. Consequently, we started with a semester-hour/contact-hour teaching load.

However, at the end of the first year, it became quite apparent that the semester-hour/contact-hour load formula was totally inappropriate to an institution devoted to systematic approaches to instruction in which the faculty member's role was drastically changed. Consequently, at the beginning of our second year, I convened a broadly represented committee, consisting of approximately one-third of the faculty. This committee met some 900 man-hours in an effort to develop a faculty load system that would be appropriate for the needs of the institution. This formula was finally developed, approved unanimously by the committee, and subsequently incorporated into the Faculty Association-Board of Trustees Collective Bargaining Agreement. I don't have a copy of that but I would suspect that the person in charge of collective bargaining at your institution has a copy of the Burlington contract.

The number of weekly hours spent with students is subject to considerable variation. For example, I can think of one person who, each semester, had contact with some 400 students. Now, it doesn't take much math to realize that, with that many students, the prospect of spending much time with any individual student is not very great. Yet, it was surprising to note that on the evaluations of that particular course, students indicated that they had received more individualized attention than they had in most of their other courses. The reason for this was quite simple. The attention they did receive was of a more meaningful type. The actual number of hours is hard to document. There are always instructors who spend what would be considered an inordinate amount of time working with students, and then there are those who spend a minimum amount.

The faculty members were required to maintain office hours of at least 5 hours per week. Most faculty members, I have found, exceeded this considerably.

One of the devices used at Burlington, and I might add one that's being used quite extensively around the country is that of employing

instructional assistants who actually work in the independent study centers or in the laboratories. These persons are employed on a 37 1/2 or 40 hour week. Their primary responsibility is to constantly be in the instructional laboratories, to be up-to-date on the subject matter being taught, and to provide assistance to individual students as they need it. Consequently, although the instructor might spend very little time with students, a student might find that he is receiving a great deal of attention from an instructional assistant or, in some courses, a tutor.

G. Q. *What is the student-teacher load?*

A. The student-teacher load at Burlington, as I mentioned earlier, is determined by the faculty work load formula. The parameters of the loading system were established at budget-building time when we would make some general goals regarding the average number of student-credit hours produced per faculty member that we were striving for.

The normal student-teacher ratio at Burlington, despite its rather small size, ranged between 20 to 1 and 22 to 1 the three years that I was there. This represented a substantial achievement, bearing in mind the size of the institution and the fact that there were normally a good number of faculty members who were working on curricular materials each term. Most faculty members at Burlington taught in the order of four courses per term, whereas, in other institutions around the state they were teaching five courses per term. Part of this was due to a rather unique calendar which we had adopted at the institution. The primary purpose of this was to provide released time to faculty members. I don't remember the exact issue, but this calendar was documented in the College Management about three years ago in an article by me entitled, "A Calendar for all Seasons."

H. Q. *Are there any special pay considerations involved?*

A. There very definitely were a number of special pay considerations. Let me try to enumerate these.

The first thought that comes to my mind, and perhaps the most substantive kind of support, came in the form of "Faculty Fellowships," which was a name given to funded curriculum development projects for faculty members during the summer. These were essentially based on proposals submitted by the faculty which were reviewed by a group of their peers and then were placed in priority order based on the opinions of the faculty review committee, the division chairman, and the dean. To the extent possible, these faculty members were funded in the summer to do work on curriculum. As best I recall, the funding rates for faculty members was in terms of so much per week by rank, and I don't remember the exact figures used.

A comment I would make regarding this procedure is that we did not look for the faculty member during this time period to

insure that he was working on the project. Rather, he could work on the project at any time or any place he chose. What we did do was to attempt to see the faculty member several times during the process to review with him his progress.

Another device that was used, that might be called a special pay consideration, was reflected in the faculty load itself, which made provisions for curriculum development and the number of students or student-credit-hours produced. In effect, there was an incentive for faculty members to arrange their courses so that they could produce larger numbers of student-credit-hours. There was also a provision for credit being given toward the required number of points in the load system, for such things as curriculum development.

Another thing that was done was the institutional practice of sending faculty members to visit other institutions' conferences and meetings, at which time the faculty might have an opportunity to be exposed to other innovative faculty members.

As I traveled around the country, I noticed a variety of systems being used. One of these is a system whereby the faculty member is paid so much per module developed.

I. Q. *How is a profession's role changed as compared to those who are engaged in the lock-step system?*

A. To answer this one would need to examine the faculty-load formula and the various categories for which a faculty member can receive points toward his load.

For example, under teaching there is a differential breakdown for preparation, for implementation, and for evaluation. These are weighed differently. There are also points given to faculty for such things as faculty advising, serving on committees, community service, and all the various things which community college faculty members are normally expected to be involved in.

With the instruction, however, the faculty member's role has changed significantly. Whereas in the conventional system, the faculty member's role is primarily that of a disseminator of information, in the newer system, the faculty member's role becomes that of a manager of a learning environment in which his responsibilities are to determine objectives for courses, to determine learning resources and activities which will assist the student in meeting those objectives, to develop valid means of evaluating achievement of objectives, to provide assistance to students wherever necessary in meeting these objectives, to provide motivation to the student to work through the various instructional activities prescribed; to make sure that the system is operating; i.e., see that materials are ready at the appropriate place at the proper time, etc. In short, he becomes a manager of student learning.

One other comment I would make is that the faculty member tends to change from that of a group-oriented instructor to that of an individual-oriented instructor. That is, he spends most of his time working with one student or with small groups of students, whereas in the past he had worked essentially with large groups of students of 20 or more.

V. LEARNING RESOURCE CENTER

A. Q. *What is the system for checking out and returning learning modules from the library?*

A. Essentially, there is no system for this. All of the learning activity materials related to a module are kept in a learning center, where they are checked out by students. None of these materials are kept at the library, which is essentially a book-oriented operation.

Perhaps I should comment about the procedure for checking out modules in the learning centers. The student identifies himself with an I.D. card and requests a particular module for a particular course. He then fills out a short form, which, in essence, asks for the information. The student receives the material and returns it to the same location.

The time the materials are checked out is logged, and the time the material is checked in is logged. This procedure gives the instructor some idea of the amount of time it's taking various students to work through the materials.

B. Q. *Do you have study carrels equipped to handle AV equipment?*

A. At Burlington, there are some 250-300 independent learning carrels scattered throughout the campus. Most of these are equipped with cassette players and slide projectors. The majority of the carrels are housed in six different independent learning centers of approximately 50 carrels each. These centers are staffed by at least one clerk-type individual who is there, primarily to issue equipment.

C. Q. *Is a record of time spent at carrels kept by the Learning Resource Center?*

A. I responded to this question above. Yes, there is a record kept.

D. Q. *How do the LRC personnel know that a student is authorized to check out a certain learning module?*

A. At present, there is no procedure called for to verify that a student is authorized. This has not presented a problem; therefore, there's been no requirement for doing this.

Quite often, materials are checked out by students who are not enrolled in a particular course, but who have heard about them and are interested. They are reviewing them for enjoyment purposes. Also, often a particular instructor will tell a student that he needs to go down and review a particular module, because the instructor has detected a weakness in that area. In addition, some learning units indicate to the student that, if he has difficulty in a particular unit, to go to the independent study center and check out a given module, which may have been developed for another course.

E. Q. *Are special personnel required for the LRC and the module production lab?*

A. The media production center at Burlington is a rather extensive operation. It is staffed by personnel specifically prepared and recruited to perform the unique functions involved. Included on this staff are such individuals as a media-production coordinator; two or three graphic artists; a v ri-typist; one or two photographers; a number of people whose primary purpose is to work in the print shop; and a general number of production persons who do a variety of things all related to preparing modules. The production people, of course, are supplemented by students enrolled in the college's one- and two-year audio-visual-aid programs.

In addition to personnel required in the production of media, there are a number of specialized persons who have been employed in some of the various learning centers. These vary from instructional assistants in the science labs to instructional assistants who are employed in the math lab and the social science lab. In a large part, these are people who work a 37 1/2 hour week. Their job consists of being available to interact with students on a one-to-one basis. In a few instances, these persons are equally qualified with the full-time faculty members, but are paid considerably less. This is primarily because their responsibilities are to work a 37 1/2 hour week involving no preparation, whereas full-time faculty members have preparations. Also, the full-time faculty member has no limit on the number of hours that he is expected to work, whether they are assigned a load or a course with the faculty-load formula. In addition, the full-time faculty must serve on committees, etc.

VI. MISCELLANEOUS

A. Q. *If a student is to perform the activities comprising a learning module away from the campus, how are the hardware requirements monitored?*

A. My answer would be "poorly." When I left Burlington, there was no provision for a student to take hardware away from campus. The result forced students to do the work on campus. This was particularly difficult for students who enrolled in the evening courses.

A solution to this that has been tried at a number of different institutions involves making various audio-visual hardware available for check-out by students showing their Student Identification Card. One college, I know of, sold very inexpensive playback cassette players in the bookstore at cost to make it more convenient for students to use. Another college had a system whereby the student might take a particular cassette home, for example, if he furnished the library personnel with a blank cassette. The library personnel had a quick duplicating machine on which they could transfer the content from their master to the blank cassette for the student. There was no cost for this service.

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. This has been a constant battle at Burlington. Based on some evidence from previous classes, we were able to determine that students scoring below a certain point on an A.C.T. and with particularly low high school grade-point-averages had a very, very slight chance of succeeding in some of our basic courses. Consequently, a number of developmental courses were initiated.

The struggle I referred to earlier had to do with the conflict between the persons in the counseling division and the faculty members. The counselors tended to endorse the position that the student has the right to fail. The faculty members argued the other point: that you weren't talking about the right to fail, but the guarantee of failure. Furthermore, the faculty members were concerned about the wide variance in backgrounds that would be represented in a given class.

This conflict was resolved eventually when faculty members developed rather detailed prerequisites for their courses, particularly in the areas of math and English. Unless students scored above a certain point on the A.C.T. or had comparable high school backgrounds, they were not eligible for enrolling in the upper-level courses.

This policy was softened somewhat, however, by the provision that a student who initially enrolled in one of the developmental courses and completed it by the end of the term, could move into an upper-level course anytime during the term.

In an ideal situation, there would be a sequence of objectives or competencies with divisional points representing courses. A student could enroll in a particular area of study and would be told the point of competency he would be expected to achieve. He would then be given a pretest and placed along this continuum at the point appropriate for his particular background. When he reached the point on the continuum that represented those competencies that he was expected to achieve, he would have completed the requirements in that particular area and would receive whatever credits would be appropriate.

C. Q. *How are the educationally disadvantaged, minority students, and "fast" students provided for in your system?*

A. Let me begin with the educationally disadvantaged students. These students are, first of all, detected through their performance on the A.C.T. or their high school grade-point-average, and are counseled by one of the counselors. The counselor makes a preliminary diagnosis regarding the course level which would be most appropriate for him.

The basic skill areas courses at Burlington go down to the very basics of addition and subtraction in mathematics, to the point of being illiterate in reading, and to the writing of sentences in English. Therefore, we were able to accomodate almost anyone who came to the institution. These courses, in a large part, were arranged to that students could move through at their own rate with a minimum amount of lecturing. A great deal of curriculum development had gone into these courses, and there were modules for most of them.

We had to be very careful in developing these materials to insure that we did not write them at too high a reading level. Consequently, we soon adopted the practice of having the folks from the reading center perform what they called a "readibility index" on our materials to insure that they were not beyond the reading level of most of the students in the class. For these students, the time constraints were removed, and they were allowed to move at their own rate. Surprisingly, we found that most students in this category, who applied themselves, were able to move rather quickly through the materials, and they demonstrated rather surprising achievements.

The second part deals with minority students. The percentage of minority students at Burlington was roughly equal to that of the population in that area -- about 11 - 14%. Not all of these students, of course, were disadvantaged, which is the connotation in the question itself. The students who were disadvantaged were handled as were any other educationally disadvantaged student. The "fast" students were handled in much the same way, as I will describe. In other words, there were no particular provision made for minority students.

The question of providing for "fast" students is particularly appropriate. Quite often, in an attempt to develop curriculum materials which are appropriate for the lower level or middle level students, we do so at the risk of boring fast students.

We were quite concerned about this problem; so, one of the things I did was to interview those students who made the Dean's list and to talk with them regarding their observations of the college. I found out a number of things from these interviews.

I discovered that many of the students on the Dean's list at Burlington had never been on the Dean's list before, and represented what might be called in some circles, "late bloomers." These students were enthusiastic about the system itself. They felt they were being challenged, but also felt that the instructional approach gave them the opportunity to truly demonstrate their ability. In the conventional situation, they had been competing with students who learned faster and, therefore, had not been able to achieve the high degree that they had at Burlington.

The second group of students interviewed consisted of those who had traditionally been "A" and "B" students in high school, and who had continued to do well at Burlington. These students presented an entirely different picture. In large part, they stated that they would not challenge as much as they should be and suggested a number of things which could be done to correct this. The single most common suggestion that I received from them was that they be allowed to complete additional projects, which would be more difficult. In addition, they suggested that their talents be put to use as tutors for students who were less fortunate than they.

Of course, the advantage of a system which allows students to move at their own rate is that the fast students can complete the course prior to the end of the term. They, then, could devote their time to other courses in which they were not so apt.

D. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. This is a somewhat difficult question to answer. Initially, due to the fact that the college would be operating first in a

high school and secondly in temporary buildings, the college had limited capacity. We undertook what might best be described as a "soft-sell" approach to the college.

Later, when we moved to our new facility and had space, we undertook a rather massive P.R. campaign to boost our enrollment both in full-time and part-time students. This was accomplished through all of the various techniques that colleges have been using for years.

We sent faculty and counselors to the high schools to make presentations. We did up a lot of brochures and scattered them throughout the county. We made mass mailings to all the homeowners in the county. We hired a P.R. person and made him responsible for issuing three, I believe it was, news peleases per week about various aspects of the college. We did all of these kinds of things.

However, I think the single most important thing that was done to motivate people to attend was the word-of-mouth comments that were spread around the county by faculty and by students who had taken the courses. They talked to other students who were still in high school or in college, or to ex-friends of their's, who were working in various jobs in the county. Essentially, their comments were very positive and encouraged the students to attend the college.

I don't think there were any questions in the minds of the students after the college had been operating for two years. They could come to Burlington County College and get, not just a good, but an outstanding, undergraduate education. I think the real question for most was, "Do I want to go away from home to attend college or stay here?"

I might add that other procedures that have worked very well are related to the Community Services Program, through which persons throughout the county are invited and encouraged to attend various cultural, social, and athletic activities on the campus. We've always tried to make this contact with the college as positive as possible, so that the image that was created of the college would be a favorable one.

One of the biggest single attractors of persons outside the college community to the college has been the swimming pool which, when I left, had some unbelievably high figure of 10,000 to 15,000 people per year using it.

E. Q. *Do you require your producers of learning modules to demonstrate competence in their area before employing them in your system?*

A. I'm not sure what you mean by "competence in their area." In a routine check done during the initial recruitment of faculty members, we checked very closly to insure that they had a proper

number of undergraduate and graduate credit hours, and that they had taught before. From this, we were able to generalize that they would be a competent teacher and disciplinarian. We did not make such assumptions regarding their competency in developing instructional modules, etc. In the interviews and on the application form, we did make inquires regarding this. At the time the college was opened, and the majority of the staffing done, there were so few people around familiar with this that it was not a very fruitful endeavor.

F. Q. *Do you have an educational technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

A. This is probably one of the single most outstanding accomplishments of Burlington County College.

Before the college opened, new faculty members were brought in some seven weeks prior to the beginning of classes and were put through a rather extensive pre-service program. Subsequently, the program was reduced to three weeks and, finally, to two weeks. This was a highly structured, very-well developed pre-service program. All new faculty members were required to attend, and later we began an optional activity for all adjunct faculty members. To date, I would estimate that there have been more than 100 adjunct faculty members who have gone through these workshops.

Many of the materials for this workshop were developed when I was at the college, and were published in a document which appeared in the Eric Collection in approximately 1971 or 1972. Your librarian should be able to dig that up for you. Since then, of course, the materials are considerably dated. I think, however, you would benefit somewhat from what's in them.

To supplement these institutionally-conducted workshops, we followed the practice of inviting outside experts in once or twice a year to conduct workshops on particular topics of interest to the faculty members. For example, one year we had Stu and Rita Johnson, from the National Laboratory for Higher Education, come in and conduct a workshop on development of self-instructional materials. In later years, we had faculty members from specific disciplines, in which faculty were having difficulty, come in and work with our faculty. I understand that this past year the college brought in a person who is an expert in the area of affective objectives to work with that area.

VII. EXTRA COLLEGE ASSISTANCE

A. Q. *To what extent are off-the-shelf learning modules, commercially produced, used in this system?*

A. Initially, commercially produced materials were used to a minimum extent. This was primarily due to the desire of most faculty members to develop their own materials. This is what I call the "not-invented-here" syndrome; that is, if it was not done by the faculty member himself, then it would not meet the needs of his students. However, as more and more faculty members gained experience in developing materials and came to appreciate and understand the tremendous amount of work that went into this effort, they became much more ameanable to examining materials produced elsewhere. The college facilitated this in its third year of operation by employing a person whose primary responsibility was to keep on top of those non-print media-instructional materials which were being produced by various publishers, and to bring these to the attention of faculty members. Consequently, if you were to visit the instructional innovations center at Burlington, you would find a large number of green library folders or binders, labeled by subject matter, in which materials from the various publishers have been placed. These are routinely reviewed and culled, and, as new things come in, they are brought to the attention of faculty members.

At this point in time, I think it's safe to say that the selection of materials has also improved significantly. This, also, has been a factor in the decision of more and more faculty members to look kindly upon using materials produced elsewhere.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

A. I would say that at Burlington this was a minimal effort. There were a number of subject-matter people who came to the campus, but they came in primarily to talk about instructional methodology rather than to provide the subject matter expertise. I think there's no question that most faculty members consider themselves to be eminently well-qualified in their subject field.

VIII. PLANNING YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year; i.e., production of learning packages, developing of systems, etc.*

A. We have discussed in some detail the steps that I thought were important, and what I will try to do now is to merely recap some of that material.

I will break them down into a number of areas beginning with:

1. *Establishment of Goals*

You need to establish the specific goals that you have in mind for the project in its final stages, and at the various bench marks along the way. Needless to say these objectives and goals should be stated so that it is possible to measure their achievement.

I should comment that the fact that the objectives are stated does not mean that they are "poured in concrete." They merely represent your thinking as of this particular point in time and are subject to change based on new information. This information regarding the goals and objectives will then allow you to not only develop an evaluation plan but to develop the procedures for accomplishing these goals.

As we've talked about this during my visit, we've somewhat outlined the procedures that would be used to accomplish the general goals that I perceive you have in mind. I would suggest that these goals and objectives be written out very clearly with some elaboration regarding procedures of how you are going to get there. This should somehow be disseminated to the entire faculty so that they will be familiar with the project and know what's happening. Furthermore, during the year, the progress of the reports should be submitted to the entire faculty. How you do this is up to you.

2. *Determining Student Interest*

In order for the project to "fly", it's essential that the recipients be knowledgeable about the project and, furthermore, that they agree to participate in it. Consequently,

I think it would be essential that you communicate to some representative group of students what the project is, the hopeful end results, and whether or not they wish to participate in it. This, of course, will require a rather thorough and total grasp of individualized instruction; and a great deal of thought should go into how this is done.

Needless to say, you cannot afford to receive a student response which is anything but positive. A suggestion here might be to formulate a small advisory committee which would include student representatives who could be involved with the project during the planning year. Of course, in this case, you need freshmen so that there will be some continuity with the second year. In addition, you will want this student group to be very representative of the types of students who will be taking the courses.

3. *Preparation of the Faculty*

In addition to being assured that students are going to be interested in participating in the project, it's essential that you discuss it thoroughly with the faculty members from which you will draw your sample. You must solicit their input and, of course, their agreement to participate.

I gather from my impressions at this point in time that you are sufficiently far along in your thinking and have developed enough expertise to be well prepared to do this. You might want to bounce some ideas regarding an outline or something off of someone. I would be happy to respond to that.

4. *Selection of Courses to be Individualized*

We came up with a list of courses, with which some elaboration would probably suffice.

I definitely think that you're on the right track in terms of sticking with the business area, and those courses which support students enrolled in the business curricula. It is quite important that you agree in advance with faculty members who are going to be participating regarding the exact courses to be developed and the time-table for development.

5. *Development of a Detailed Calendar for the Year, and Tentative Calendar for the Second and Third Years*

I would suggest that this calendar be prominently displayed so that all the staff and, for that matter, students could see it. From time to time, during meetings of the staff members involved with the project, reference should be made to the calendar and the progress toward achieving the various bench-marks within the calendar.

6. *Determination of Content for the Workshop to Teach Faculty How to Develop Modules, and Selection of Person or Persons to Conduct the Workshop*

I think that, of all the decisions you make, this one will, in the long run, prove to be one of the most critical. As I have indicated to you, I think two weeks is an appropriate length of time for a workshop for this purpose to get the faculty started. I also have indicated that I will be sending you a copy of a tentative outline of topics which should be included in this.

Let me just enumerate a few of the things which come to my mind at present. Some of the topics would include such things as exposure to Bloom's "Learning for Mastery" concept and the theories supporting that; the rational and research findings supporting what I call a "systematic approach to instruction;" writing of instructional objectives in all three domains; the sequencing of objectives; performance of a task analysis; familiarity with the various taxonomies of objectives; practice in writing and classifying objectives in various levels in the taxonomy; the development of test items appropriate to specified objectives; the exposure to the various types of individualized instructional materials; actual experience in developing individualized instructional material; grading systems compatible with mastery learning approaches; familiarization with various approaches to individualized instruction; problems and issues in implementing individualized instruction (such things as registration, student motivation, etc.).

The content of the workshop is important. By far the most critical decision is that regarding the person or persons who would be conducting the workshop, and their ability to relate to the faculty effectively. Conducting a two-week workshop is no easy task. There will be high points and low points, and the group leaders are going to have to be sensitive to that.

The group leaders will also need to make provision for, what I jokingly call, "attitudinal adjustment hours," when you put down the papers, go away to some quiet place, and have a few drinks. Also, I think the group leaders should be familiar with group dynamics. If they perceive there are problems within the group (for example, communication problems) they would be able to correct these difficulties. What you are concerned with here is not only teaching people subject matter, but also building a team of people who are mutually reinforcing one another.

7. *Selection of an Advisory Committee*

I was pleased to note your plans to appoint an advisory committee. I think you are on target regarding the functions of that committee. I would go on record, however, as recom-

mending that the advisory committee consist of at least two persons with broad backgrounds in the community college.

The functions of the advisory committee should have included among them the following: to assist in the evaluation of the project; to serve as a sounding board regarding suggestions for the project; to review the goals and objectives for the project; to review the plan-of-action for the project; to serve as a resource person to the faculty and other persons involved in the project; and to be re-enforcers for the persons involved in the project. By this I mean that the advisory team (or committee), when visiting the college, would spend at least half their time with the persons who are actually involved in producing materials. All of these people should be capable of reviewing materials and providing useful feedback to the faculty. Finally, I think the advisory committee, through their expertise, should be able to help break some of the log-jams which I forsee with the administration.

8. *The Appointment of a Local Committee*

In addition to the advisory committee which has its unique functions, I think there is a definite requirement for a committee at the campus level. For example, this committee could consist of a few students, a representative from the faculty association, the entire faculty who are involved in the project, learning resources center staff members who are involved in the project, and possibly a dean or associate dean. This group should meet periodically to review progress, to discuss problems and successes, to offer suggestions, and to mutually reinforce one another.

I made a particular point about the inclusion of a faculty association representative because of experiences I've encountered in other institutions where this was not done. You've got nothing to lose and everything to gain by involving the faculty totally in the project.

9. *Publicity*

I think careful consideration should be given from the very beginning to publicizing the project. This would include newspaper stories, possible TV coverage, articles in the student newspaper, possibly the generation of one or more articles about the project for publication in journals, such as the Junior College Journal, etc.

The publicity would not end there, however. I think that the facilities themselves should--and consideration should be given in their design and decoration--be creating an atmosphere which says, "We're doing something great."

As reports of various types regarding the effectiveness of the program begin to come in, I think these should be publicized to the maximum degree. In effect, here you are building up a head of steam which will, hopefully, carry you through any rough times you might encounter. One caution I would make here. You should consider this an experiment, and you should not emphasize it's virtues at the expense of alienating the majority of the faculty who are not involved in the project. This is a rather ticklish tight-roping act.

10. *Administrative Training*

For the project to succeed, it will not be sufficient for the faculty to be well-trained or that it have good publicity, etc. The project will fail if the various administrative officials who will be of influence in the program are not involved and are not supportive of the program. To initiate the development of this kind of support, I think you need to first develop understanding. Consequently, I would propose, probably, a one to two-day workshop in which the various administrative persons such as the registrar, the scheduling office, the various instructional deans, the division chairman of business, etc., and, if possible, even someone from the business office, are presented with a complete overview of the project and perhaps going even beyond that, a thumbnail sketch of the program itself. For example, I would see absolutely nothing wrong with their being exposed to Blooms' their being exposed to Blooms' "Learning for Mastery." In addition, I would encourage these persons to attend other institutions which are doing some of the kinds of things that you will be doing so that they might learn about the various procedures and policies that were implemented in order to facilitate. They key word here is just that -- facilitation. I predict that there will be times when you will want to pull your hair out; but you are going to have to just "suck it in" and be patient.

11. *Provision of a Proper Atmosphere Within the Working Team Members*

It may seem like a broken record, but I want to emphasize again the critical importance of providing mutual reinforcement for the various persons involved in the project.

There will be times when you will feel extremely lonely. There will be times when you will feel as though you will want to throw up your hands and forget the whole thing. To combat this kind of feeling, which I predict is inevitable, you need to develop a very strong team atmosphere, so that other members of the team, who don't feel that way, will be able to provide reinforcement in critical times.

There are a number of techniques that can be used to accomplish this. The first of these I have already referred to; namely, the problem of everyone in the project having meetings to discuss the project. I think sponsoring trips to other col-

leges where exciting things are happening would help. Similarly, I think visits to Camden County College by persons from other colleges who have been doing things would also help. Visits with the President and Dean to the center on a periodic basis can go a long ways. Opportunity for various members to make presentations to, say, the board of trustees during the progress of the project. All of these things, together, will determine the success or failure of the team effort which, of course, will determine the success or failure of the project.

12. *Development of Facilitating Procedures*

Although not a critical matter, since courses will be taught during the first year in much the same fashion as they have been previously, the first year will afford an excellent opportunity to establish the ground work and to do preliminary planning for various procedures which will be necessary for full implementation the second year. Questionnaires, which include a number of areas, will need to be prepared. I would also include the registration system, the possible changes in the grading system, the development of procedures to insure that modules are printed properly, coordination with the business office regarding payment of tuition, accounting for students, procedures of checking materials in and out, all the various record-keeping forms that would be required, procedures for distributing materials, all these and similar kinds of procedural matters can easily occupy the time of the director the first year. To save time in this, I suggest you make a visit to Burlington County College and to at least two other institutions which are doing similar things. These visits should enable you to save a substantial amount of development time.

13. *Planning of Facilities to House the Learning Centers*

There are any number of ways the learning center can be planned. As I travel around the country, I've seen a variety of approaches being used, all of which seem to work reasonably well. I would suggest that you not move too quickly on this. Allow the faculty members to gain some experience in developing materials, etc., and then involve them in helping you lay out the facility.

Essentially, what you will be requiring in a facility is a place for students to work, where they can have available to them the various hardware and software that they will need to work through the modules, a provision for issuing the modules, a place for a proctor or instructional assistant to work, who can provide assistance to students they encounter, and some provision for testing. With regard to testing, you might want to take a careful look at the testing center at Burlington County College. It could be that you could utilize some of the things they are doing there. You might also want to talk with Sherman in depth about this. The proctor testing is a critical aspect of PSI.

14. *Quality Control*

It's been my experience that, without some sort of quality control, it's quite easy for faculty members to spend a great deal of time in curriculum development with the end result being, essentially, a pile of junk.

To insure quality control, there are two essential ingredients. The first of those is that faculty know initially what they are to do. Secondly, as materials are produced, they should be reviewed by the only group who is in a position to provide any valid criticism; namely, students.

To supplement this, you might have the persons who conducted the initial workshop come back and review with the faculty members materials that they have produced and handle other problems that they might have encountered.

I would also suggest that the advisory committee members be asked to spend some time on this matter. Also, when an outside consultant is on campus, one of his responsibilities should be to review materials produced by faculty, and to provide you with an evaluation of those.

IX. IMPLEMENTATION YEAR

A. Q. *Please list the major activities and events that must be accomplished during the implementation year; i.e., field testing, evaluation, admissions, etc.*

A. Rather than spend a great deal of time on that (since I would expect that the evaluation consultant provided an outline on evaluation), I would like to make a few general comments regarding the implementation stage.

The implementation stage will be preceded by a great deal of apprehension and tension among the team. Consideration will need to be given to this. Tempers may flare toward the end, as people are anxiously attempting to get materials together for the first trial group of students. Once the term begins, there will be a temporary high, followed, I would predict, by a low. You will need to anticipate this and provide for it. A number of appropriate shots in the arm during the year, such as publicity about the program, etc., will be most appropriate.

Procedures will, of course, need to be established for gathering and providing data for reviewing units, compiling student evaluation data, etc. These are more-or-less procedural in nature, and I will not spend a great deal of time on them. However, they are critically important.

Also during this year, you will be interested in documenting, wherever possible, the cost-effectiveness of your program and setting up procedures for gathering the data necessary for making such evaluations. Your evaluation consultant should be of much use to you in setting up an information system to accomodate this.

Periodic staff meetings should include a "show-and-tell time" in which all team members have a chance to share with the team their successes and failures.

Social activities involving team members and their wives will be particularly appropriate at this time. In fact, while I mention wives, I might comment that, by all means, don't overlook the effect of participation in a program like this on the family. All too often, spouses are totally unaware of what their mates are doing at work. This project affords an excellent opportunity for you to take the initiative to get them involved.

X. BOOKSTORE

A. Q. *What involvement does the bookstore have in the selling of software to students?*

A. I think I responded to this one earlier. Essentially, the involvement of the bookstore is determined by the decision of how materials are to be distributed. In some colleges, materials are placed in the bookstore and are sold to students. There are both advantages and disadvantaged to this procedure. One advantage is that the faculty member doesn't have to worry about it. A disadvantage is that students who enroll in individualized courses sometimes pay a premium for that priviledge. As I indicated, Burlington assesses a standard materials fee throughout the college for every student, based on the number of credit hours they take. They then make the materials available to students in various learning centers. This is something you may want to consider.

B. Q. *How are prices determined?*

A. I read with interest the detailed description of Bob Toft. At Burlington, we were nowhere near as sophisticated.

I made an administrative decision that we would sell the materials in the bookstore for essentially what it costs to print them, which came to approximately a penny a page. I saw no reason for the bookstore to make a profit on these things, and was able to push that policy through.

If cost is a problem on this, I would suggest that you look at what Toft is doing and develop something along those lines. My only caution is that you be careful that enrolling in one of the individualized courses does not become prohibitively expensive.

C. Q. *Does the creator of the module receive royalties?*

A. In the case of Burlington, no, unless the materials had been produced commercially. The patent and copyright policy at Burlington essentially gave the copyright of materials developed at the college to the faculty member. It provides, though, that the college retain the right to use the materials as long as the faculty member was at the college.

Another approach used to copyright is for the institution to maintain the copyright, to do its own negotiating with the publishers, and to then share any royalties which might be received with the faculty member. Frankly, I don't think that's the way to go.

Another approach that was used, I believe by Oakland Community College, was to work out an arrangement with one publisher, who than assumed responsibility for publishing all materials generated from the college. This had the advantage of uniformity and you were negotiating with only one publisher. Unfortunately, it had its disadvantages, not the least of which was that the publisher soon assumed a vested interest and began to dictate to a large extent the content of the materials. I would proceed rather carefully in this area.

As I indicated to you, I'll be sending you a copy of a report which one of my grad students recently prepared regarding this topic.

XI. EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel, and other components?*

A. I will not say much in this area, since the evaluation consultant should be providing the basic information for answering this. Essentially, my comment would have to do with making a distinction between formative and summative evaluation and the importance of using a criterion-referenced approach to all evaluation.

I think it absolutely essential that goals and objectives in all areas, both affective and cognitive, be established initially for the project and by faculty members within their courses. The primary evaluation, then, would be determined by the extent to which those objectives have been achieved.

In addition, I think you will want to look very carefully at other considerations such as cost. For example: 1) if the program costs more or less than conventional instruction; 2) attrition rate; 3) student satisfaction; 4) success of students in later courses; etc.

The item "reduced attrition rate" should not be overlooked. As I indicated to you, the effect of a reduced attrition rate can be a substantial one on the budget. It was our experience at Burlington that attrition on the freshman class, in the last two years of the college, has not exceeded 10%. When this is compared with the 25-and-up attrition rates at other institutions, there is a considerable difference in income there if you receive state funds based on enrollment in each term, not just the Fall.

XII. COSTS -- BUDGET

A. Q. *What is the ball-park figure for establishing a multi-media production lab -- keeping in mind personnel, equipment, supplies, and student workers needed?*

A. My review of your budget is about the extent to which I would be able to help you with this. My concern is that you provide sufficient personnel and equipment to do the more basic kinds of module development, which will consist, essentially, of cassettes, slides, and, possibly, some vidio-tape. I'm not particularly high on film strips because of their rigid fixed nature; and I don't think there's much of a place for television, since it's essentially a group-oriented medium (to be cost-effective). I would suggest that a visit to Burlington and a talk with Jerry Holt, the Coordinator of Media Services there, might be very useful to you in reviewing your present plans.

B. Q. *What is the cost of producing a set of learning modules composed of script, workbooks, taped lectures, film slides, and/or film strips, covering approximately 45 to 50 hours of instruction?*

A. I wish I could say. The cost varies so tremendously from faculty member to faculty member, and from subject matter to subject matter, that I find it difficult to imagine how it would be possible to come up with an average figure.

One of the most significant factors is that of faculty time. In your case, this should be relatively easy to measure since you have already determined faculty members will receive "X" amount, for which they are expected to produce, essentially, two courses. Simple matter of division should yield the faculty cost figures for that.

It shouldn't be too difficult to get cost for paper and slides, etc.. However, measuring personnel costs will prove to be something more difficult. If your system is set up so that people keep a record of how they spend their time according to the project, it would be possible, after some period of time, to make some generalizations regarding the amount of time spent on each project, and from that to derive some cost figures.

If you are interested in those kinds of things, I wish you well. I always preferred to deal with the overall cost of the instructional program as compared with more traditional approaches to instruction, rather than to focus on the trees which comprise the forest.

C. Q. *How many hours of production effort are required to produce one hours of multi-media learning?*

A. Again, I have no idea since it varies so much from person to person. I have found that faculty members vary by as much as a multiple of five in the time it takes them to produce a module. I've known faculty members who could produce an excellent module first draft, in as little as two hours, while I've seen other faculty members who sometimes required 10 hours to do essentially the same thing.

Of course, the experience of the faculty member must be taken into consideration here, and the differences among the various subject fields. For example, to produce a self-instructional module in speech for the social sciences normally requires a great deal more time than in, for example, business or one of the sciences.

Also, the experience of persons working in the production lab have to be taken into consideration. If you are successful in finding audio-visual technicans from one of the few community colleges with such associate degree programs, you will be fortunate because these people have had experience in doing precisely the kind of thing they will be doing with you. They should be able to do it effectively and efficiently.

D. Q. *How does the cost-effectiveness ratio of your system compare with the cost-effectiveness ratio in lock-step systems?*

A. Generally, I would state that the Burlington experience illustrated conclusively that an innovative instructional approach can be conducted economically.

When I left Burlington, we had the best instructional cost in the state, despite the fact that visitors to the campus were constantly amazed at the support that we provided our faculty. We spent some $20,000 to $30,000 a year on curriculum development projects. We had faculty traveling all over the nation. We provided unusual support in terms of secretaries and printing for the learning resources. Yet, when all this was said and done, our instructional cost was the lowest in the state.

Of course, the reason for this was not totally because we were implementing individualized instruction. A very tight (to some people) rigid control over the curriculum, a very carefully worked out registration system which insured that we cancelled a minimum number of classes and that we met our average class size perameters each term -- all of these and others played

a significant role in achieving our goal of more effective instruction at less cost.

From the Burlington experience, I think I can make some generalizations. Your personnel costs will probably be approximately the same. However, your personnel will consist of different people. You will soon find that you don't need as many full-time faculty members since the role of the faculty member has changed from that of disseminator to one of manager. Much of the contact with students can be done with persons whom we call "Instructional Assistants," who work on a 37 1/2 hour week basis. They work for approximately $8,000 and provide more individual attention to students.

When you amortize the cost of the equipment, which will initially be higher, I think you will find that it's actually less.

You will definitely require less facilities than in more conventional approaches to instruction. For example, the total number of square footage-per-student at Burlington is probably the lowest in the state.

Operating costs will be somewhat higher in certain areas; such as photographic supplies and printing. Your printing budget will double, triple, and quadruple very quickly. Attention should be given to finding a source of inexpensive paper.

In some areas, however, you will no doubt accomplish a realized savings due to the fact that more students are utilizing the same materials.

Camden County College

The Non-Lock-Step Educational System

Interview of

DR. GILMOUR SHERMAN

On Individualized Instruction

January 30 - 31, 1975

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Postsecondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College Campus to advise Professor Mario J. Giordano, its Director, on planning and implemanting individualized instruction systems.

The following is a report on the dialogue between Professor Giorda and Dr. J. Gilmour Sherman, who visited the College in the role of a consultant on January 30 - 31, 1975.

J. Gilmour Sherman earned his Ph.D. in Psychology at Columbia University in 1959. He has taught at Barnard College, the University of Sao Paulo (as a Fulbright Professor), and helped set up a new Department of Psychology at the University of Brasilia. He has since taught

at Arizona State and Georgetown Universities. As a Director of the Center for Personalized Instruction, he edits the quarterly PSI Newsletter and participates in PSI conferences and workshops across the country.

The Center for Personalized Instruction was created in 1973 to provide help to college teachers who want to use individualized instruction in their classes. Its programs include regional conferences, workshops of various lengths, the publication of the PSI Newsletter, and the distribution of literature on individualized instruction at the college level.

The Keller Plan or Personalized System of Instruction (PSI) is a teaching method that can be used in a variety of educational situations. The systems allows the students to: (1) move at their own pace through successive units of a course of study; (2) be tested as often as necessary to assure their mastery of each unit (with no penalty for failure); and (3) be graded on each test by a well-prepared and well-guided student proctor.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least eight to ten consultants. The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report, that will be presented to H.E.W. in June of 1975.

INTRODUCTORY REMARKS

Georgetown is an enormously traditional university. Probably in no important way unlike Columbia, Yale, or Dartmouth. I'm sure the rules and regulations are all about the same. There are no more than ten PSI or self-paced courses on campus. They fit somewhat uneasily into the normal format alongside the traditional lecture courses. Even for those ten, there are no special rules, no special considerations in terms of the general overall college rules and regulations. Whatever differences there are between the regular lecture courses and the PSI courses are differences in rules that are internal to the course itself, not in terms of how it makes contact with people like the Dean, the Admissions Office, the Registrar, and so on.

The second point is that the regular faculty member plays a very, very small part in Admissions, Registration, the concern of the Bursar's Office and so forth. Normally, the faculty member isn't asked to participate. And even when he is called upon, he attempts to avoid it on the basis that he is too busy performing as a scholar or what have you.

Even during my years as Chairman, sitting on the Dean's Council of Chairmen, we would worry about things like overall policy in terms of "Should we have a language requirement" or "Should there be a distribution requirement between the Humanities and Sciences." But we almost never

discussed the details of Admissions, Registration, or the Bursar. So, we have a situation of a college that, in terms of these procedures, is in no way different from Harvard or Colgate. Whatever it is they do and whatever it is that Georgetown does, I know very little about it. The few facts that I know about Admissions, Registration and Finance are mostly second-hand information, and I don't think they are very insightful. But, I will try to answer your questions as best as I can.

Part I

ADMISSIONS

A. Q. *How does a student apply for admissions to Georgetown University?*

A. About the only thing I know is that he sends an application to the Dean of the Undergraduate Admissions Office by January 15 of each year. I assume he needs a letter of recommendation and transcripts from high school and so on, but I really don't know what those are.

B. Q. *What are the Admissions Requirements?*

A. I know they have to take the SAT or ACT. As far as I know, there is no automatic cut-off score. I have heard rumors -- well, more than that. I heard the President mention -- I don't know whether he was bragging or reporting a reality -- that the freshmen, entering class at Georgetown one year scored higher than the entering freshmen class at Harvard; the second year they scored higher at Harvard. The two universities pass it back and forth in terms of the mean SAT scores for the entering freshmen class. So, I gather the students are bright. Whether that just happens or whether there is an informal, cut-off score or whether it just results out of competition, I don't know.

I think there are a few other subsiderary requirements in that the students must have four units of English, two years of social studies, two years of a foreign language and two or three units of math, or something of that kind. I have little information on these matters.

C. Q. *What are the Record-keeping forms and procedures used in the Admissions Sub-system?*

A. I have absolutely no idea what the record-keeping forms and procedures are in the Admission Sub-System. I called the Admissions Office and they said, "Unless you want to come over and study for a day, you'd better forget the whole thing."

D. Q. *When the student leaves the Admission Sub-System, what proof does he carry with him that he has been admitted to your school?*

I'm also not sure what happens in terms of allowing the student, when he leaves the Admission Sub-System, to prove that he's been admitted.

The only think I know about the recording of Admissions is that whatever they do is done poorly. Our University newspaper carried an announcement last week that the deficit (something like two million dollars) that had been projected for this year's budget had been miraculously and wonderfully closed because somebody in the system suddenly found there was something like 200 or 300 additional students enrolled at the College (part-time, I presume, but I'm not sure that they even knew that), and that the tuition from those extra people closed the gap. Life wasn't quite as bleak as we thought it was.

The Admissions Office, in response to that, has now initiated something called an "I'm Here" card, that students must fill out at the beginning of each semester when they go through registration. Apparently, there has never been, at any point before, a single thing that all students had to do. Previously, they could be enrolled in the College, take courses, and I guess even graduate without anybody knowing it. It boggles the mind.

I don't know how it happens, but they now have invented this new, "I'm Here" card which everybody has to deposit. If it is not turned in at the beginning of the semester, the student's name is then taken off the role of courses for which he is registered, and he has to go through a special re-registration, re-admission procedure. So, presumably, from now on we'll know how many students we have; but until now, apparently, we didn't.

Part II

REGISTRATION

A. Q. *Where does the student get advice about scheduling, curriculum, and courses?*

A. Primarily, from the undergraduate Dean's Office. There are three or four people on his staff that are full-time in terms of curriculum counseling. Over and above that, all of the major departments have some one member of the faculty who is designated as Director of Undergraduate Studies for that department. That person will advise and provide academic counseling to the majors in that department or, in fact, to anybody who wants it; but that advice, again, is segmented and solely with the respect to the rules and regulations of the department involved. In terms of overall curriculum planning, advisement is done in the Dean's Office.

B. Q. *How does the Registrar know the student has been authorized to enter classes for which he is registering?*

A. Most of the registration takes place during a given series of three or four days. I believe it's held in the gym. I've heard it's a mind-boggling thing to witness; but, I've never been there.

Presumably, there are cards made up for each course equal in number to the number of students that will be allowed into the course. I gather the student goes down to the gym, goes up to the table for English 12, and asks for a card; and, provided there are cards left, he gets one of those and deposits it somewhere else.

Some of our courses are indicated as available only with the permission of the instructor. In those cases, there are special cards for those courses. The student picks them up in the gym and brings them around to the faculty offices and has them initialed by the faculty members. But, that's only in cases where permission for registration is restricted to permission of the instructor. Somehow, all of these cards that come out of the three days of registration get fed into a computer that prints out the initial course list which is then sent to each instructor. So he knows the size of his class, he's supposed to get it a week before classes start.

Again, this system doesn't work very well. The initial class lists generally come in to a faculty member's office about ten days after the semester starts. So, we all meet our first classes having absolutely no idea how many students we're facing or who is in it (unless we have designated that entrance to the course is with the instructor's permission, only.)

C. Q. *What proof does the student have, upon leaving the registration sub-system, that he has been admitted to school and has gone through registration.*

A. As to what proof the student has after leaving registration that he has been admitted to the school and he has gone through the registration sub-system, I have no idea how that happens either. The incident I talked about earlier, finding that the University had more students than we thought we had, suggests that not only doesn't the student know but also the registrar doesn't know. The whole system doesn't function very well or very efficiently.

The only part I come in contact with is, once those initial class lists do come in, they are checked against the students present. If a student is attending class and he's not on that list, he's sent off to the Registrar's Office and told to sign an add slip, which then comes to the faculty member through the campus mail. If an add slip isn't signed within something like ten days, the name is dropped from the second addition of the class list.

If a student is listed on the list and doesn't appear, then the faculty member is responsible for informing the Registrar's Office. And again, the name is taken off the list by the second edition (which comes out something like five weeks into the semester).

Georgetown, as I said before, is a very traditional college. Except for some very few courses, they is nothing self-paced, modularized, or individualized about the general offering of the College

D. Q. *Can a student register at anytime during the year?*

A. Except for these very few courses, no.

E. Q. *Is there a minimum and maximum number of courses for which a student may register?*

A. As far as I know, there is no minimum and maximum number of courses for which a student may register. I believe, somehow, the fees vary. I'm not quite sure how. The counseling that the students get at the Dean's Office, or by talking to the Director of Undergraduate Studies, contains recommendations as to how many courses constitute a normal program. The student is invited to sit down, look at his record, and make some decision about whether he is capable of taking a heavier-than-normal load, or (having some difficulties) perhaps should try a lighter-than-normal load. But, there are no ultimate rules or regulations in terms of maximum and minimum.

Part III

BURSAR

Introductory Remarks

I have even less information on this question than on the first two. The incident (of the missing and then found students and the million dollar deficit and new-found money) suggests that there is a gap somewhere between the Bursar and the Registrar that hasn't been working well; though I don't know how or why.

A. Q. *What is the tuition amount charged for each course or module?*

A. That is $88 per credit hour.

Part IV

FACULTY

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. I mentioned earlier that this is accomplished through the initial class lists. The student is either on it, as a result of the Registration process, or is sent off to the Dean's Office or the Registrar's Office to fill out an "Add Slip". Then, he is placed on the list the second time around.

B. Q. *What sort of orientation does the mentor give the entering student?*

A. I assume this is about a freshman entering the College. Here I'll begin to talk about our self-paced courses -- at least my own.

On the first day of each semester, everybody enrolled for the course shows up as he would for a normal lecture course. In fact, for the first part of the initial class meeting, there is a normal lecture; but the lecture is essentially on how the course will proceed. So, I'll lecture at length about how my PSI course is different from most of the other courses at the College. I will first talk about how a PSI course works, why we are doing it that way and what are some of the advantages that we think such a course offers. After that, I'll explain the procedures and policies of our peculiar format. Then I usually show a movie that the Center made about how such courses function. Following that, I'll pass out a course policy statement, which is perhaps a five, six, or seven page discription in written form of how the course is going to function. In many ways, this is redundant of what I've said in my initial opening mini-lecture ; and in many ways, redundant of what's in the film. But this is at least something in print that the students can read, take away with them, keep with them during the semester, and referred to when questions arise.

At the end of that first initial class meeting, a student reads the course policy statement. When he thinks he understands it, the PSI course begins at that point; he comes up to the front of the room, asks me or the course manager for a quiz on the course policy -- essentially Unit Zero. A quiz on the course-policy statement is given to him and he goes back to his seat, fills that out, answers questions about the course policy, and takes it to a proctor. Given that he passes it, and it's almost always the case that he does, he is now ready to begin Unit One.

The only other thing I'd add about that initial orientation is that I've found the quiz on course policy to be a very useful thing. Like any other quiz, students take it, sign their name to it, leave it behind, and it goes into their folder which is a record keeping system we will talk about a little bit later.

We have a file showing that the student has read the course policy, has taken a quiz on it, and has indicated that he knows the rules and regulations of the course. While almost everybody's course is somewhat different, there generally are a few rules and regulations which you don't want broken. Without that first initial Unit Zero quiz on course policy, students very often will show up in the middle or the end of the semester and say that they thought it was self-paced and that here they are on the last day of the semester to take all of the unit quizes. Well, that's not what you want. A few will claim that they didn't understand that. I happen to have a rule that, at least initially, students can only take quizes on one unit in any given day. Later on in the semester, that rule is relaxed; but at least initially, I think it's a good idea. Students will claim they don't know that. In courses with as much flexibility as these, individual students will try their individualized solutions to getting around the rules and regulations, generally claiming when you point out something that, "Oh, that was something I didn't know!" With this Unit Zero quiz on file, it's very easy to indicate that, yes, they did know because they answered the quiz and wrote down what those rules and regulations were. If the rules are being broken, at least the student can't claim ignorance. I'll leave a copy with you of that course-policy statement and a copy of the quiz that they take on it.

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, the completion of modules, and the issuance of the next sequential module?*

A. When we first developed PSI, it was our thought at the time that at the point at which a student passes a unit or module, part of the procedure would be to congratulate him, if you will, for having mastered a unit, while handing him the next unit, the next package or the next module, along with a pat on the back and a smile as a small reward. Whatever the merits or faults in viewing the issuance of these as a reward, reinforcement, or badge of honor, it didn't work. It became obvious that, in a self-paced course, since some students will be on Unit Two and others may be on Unit Five and still others will be on Unit Eight, copies of these modules will be available in the dormatory or in the fraternity houses. Unless we wanted to set up some elaborate policing system which ultimately wouldn't work either, the unit modules will be readily available to the students outside the class system. As soon as the most advanced person in the course has a copy, there is no problem circulating it to others in the dormitory -- there's really no point to hide them. So we stopped that procedure.

The modules are set out on a table in front of the room, and students are perfectly free to pick them up at any time they wish. We encourage students, however, to pick them up only when they are ready to deal with that particular unit. If they pick up a whole pack, they'll probably lose them, and our duplicating costs will be increased. We point out that we've gone to an enormous

amount of effort to break this course into units, and the reason we've done it is because we've found students learn better that way. By taking several units at once they are undoing the work we have done in their interest. If they take larger and larger numbers of units all at once, they will find that they have more and more difficulty on unit tests. Besides, there is that rule that they can only be tested on one unit on any given day. Most students do not take piles at once. They seem to work along at their own pace and pick up the next module as they finish the previous one.

A second thing that happened with that system I just mentioned--of having units mimeographed, dittoed, or xeroxed in the department office, put into packets, and then set out on a table in the front of the class--is that it drained the department of its duplicating budget. It's necessary the first time you are using the materials because you are watching student performance and, perhaps, almost every day rushing back to correct defective instructions or mis-worded questions or study guides, and so on. Once the materials have been tested and corrected and reach the stage of at least adequacy, then (largely to save money on the departmental budget) we have them printed and bound and sold in the bookstore. It's really an economic kind of thing. Once a course is perfected, a student buys his whole package at once. He will then have all of his learning modules for the entire course.

On the procedure for performance of activities involved in the module, each of the unit study guides has in it a procedure section that describes what it is that the student should do to

master the material prior to coming in to take a mastery test. In most cases, the involvement is in doing some reading. In most cases, the procedure section will indicate what pages need to be read. Sometimes, there will be a list of objectives for that assignment, or there will be notes about how to read a particular section that students had trouble with in the past. Students are told that while reading they should remember the definitions of such-and-such or so-and-so, or given other hints or suggestions. Then, a list of study questions may be given that help the student determine when, in fact, he has mastered the content of that unit and is ready to try a test. That's roughly the format of most of our units.

There are some units, however, that are not reading units. Some are laboratory units where the student has to contact a traditional laboratory, where the laboratory sheet lays out the procedure of the experiment he should conduct, the data he should record, how he should plot it once he has recorded it and how to conduct the experiment. So, it becomes a laboratory unit rather than a reading unit, and it is self-paced and mastery-oriented like any other to the extent that if the student's data analysis isn't correct or his summary comments or discussions are not adequate, then the report gets passed back to him with comments as to how he can improve it — either by replotting his data or re-calculating it or, in some cases, re-doing the experiment because his procedures were wrong.

Occasionally, the student will have other kinds of units that involve seeing a film or attending some other kind of special activity. Some courses may have a discussion unit that will say, "After you've finished Unit Five, join the discussion on the following topics." There will be a study guide preparatory to that discussion section. The student then joins in with five or six other students who have reached the same point in the course, with the instructor. Objectives are specified. But, 90% of our units are reading units, and the other 10% are laboratory units. We don't find it necessary to put in other kinds. I think it's probably a matter of discipline. We've got some Sociology PSI courses on campus that use the discussion unit quite frequently; there are some other courses where the instructor finds audio-visual materials particularly helpful. We don't seem to need them, in most cases, for the content that I happen to be dealing with. If you don't need A/V materials, then they are an expensive luxury and, essentially, a pain in the neck. So, I'd be perfectly happy and enthusiastic about using such things when they are needed, but to use them just because they are there is a lot of trouble.

About the procedure for the issuance of the mastery test -- well, when the student has completed his study guide, found that he can meet the objectives, has read the assignment, finds he can answer the study questions, and so on, he'll come in, ask the course manager for a test, and sit down and take it. As soon as he's finished, he will go to see his proctor. The proctor will look it over and may tell him that he has a perfect score, and that he is prepared to go on to the next unit. Even if he does have a perfect score, the proctor will often engage him in a bit

of a further interview and conversation, particularly if there were any objective questions on the test -- asking him how in fact he made his decision, what was the information that allowed him to be correct, and what he based his choice on.

If he has errors on his test, a few general instructions are given by the proctor. It is his job not to give away answers, but to give out instructions as to how the student can most effectively find the answers for himself. So the proctor will tell the student that he missed question eight and that he could go back and re-read Pages 25 and 26. Perhaps he should read it recalling that in the previous unit the answer to such-and-such was whatever it was; and maybe if he reads this particular section with the previous information in mind, it will be more clear. He also, perhaps, missed Question 3. That indicates that he neglected to read the table or look at the figure on Page 32; he read the text but didn't bother to look at the figure or the table; and he'd better go back and look at that. Once he does, he'll find the information that he needs there.

So the student goes back to study the specific areas where he was found to have problems. Later, he comes back and takes the second form of the test. Hopefully, this time he passes it with a perfect score and goes on to the next unit. If not, he again receives further instructions as to where he seems to be having trouble and what he should re-study. He then repeats the cycle.

Initially, when we set up the PSI courses, we had it such that a student could take a fourth test, a fifth test, a sixth test ad infinitum. We finally recognized that this was a buckshot approach in that after two or three tests the student is asked to answer questions again and again on material that he knows very well. It's not a very "pin-point system" in terms of the few places with which he's having trouble. What we do now is after a student fails to pass after three attempts with proctors, he is sent to the instructor to me. We'll sit down with the three forms of the test; and, invariably, a picture emerges of the kind of errors he's making, where the problem is, and where he needs a more detailed description of how to solve this problem than the proctor is able to give. I will give him further instructions as to what he needs to re-study, re-read, what he might keep in mind, and so forth. Very often, I will write out a special test or an essay question that is on-target to the kinds of problems that he is having. He goes off and re-studies, answers the essay question that is directed no longer at a broad range of everything in the unit or module but now strictly at the point where he is still having trouble. He writes a brief essay on that particular area; and if he does so successfully, he goes on to the next unit.

Once he has passed his mastery test and completed a module — whether it is the first, second, or third time or only after talking with me and answering a special question from some special study — then he's ready to proceed. The next module in the sequence is either freely available on a table in front of the

room, where he can pick it up; or, in fact, he already has it in the study guide packet he bought in the bookstore in the beginning of the semester. So, he's told he can go on to the next unit, and he does.

D. Q. *What are the forms involved in this sub-system?*

A. There aren't too many. When the student takes a test, he answers that test not on the test itself but on a special answer sheet. We'll talk about why in a minute. The proctor keeps that answer sheet after correcting the test with the student whether the student was right or wrong, passed it or was unsuccessful. The proctor keeps those answer sheets for all students that he works with during the hours that he's on duty. When the proctor finishes the job for that day, he takes all the test answer sheets that he's corrected and files them in the student folders. Each student has his own. He doesn't keep it; the course manager does. In it, all the tests that he's taken are filed. Whenever a new test is put into his folder, a notation is put on the cover of the folder concerning what unit, what form, what date, whether he passed or failed it, and who the proctor was. So, for any individual student, we can quickly pull his folder and make a quick scan to find out whether he is working more or less regularly; how rapidly he is progressing; how many times he is passing a unit the first time; how many times does he have to repeat a test; does he seem to be having trouble; and is he moving on without too much difficulty. We can find out what proctor he is seeing, so we can discuss his problems with the proctor if we need to. So, we've got a general reco

record on the cover which can be quickly scanned and is easily accessible. If we want more detail in terms of what kinds of questions does he typically have difficulty with, we can go back into the folder and look at each individual test to see if we can find patterns of what kinds of things seem to be troubling him.

That's one form. The only other form concerns the procedure for signing out tests. That form is maintained by the course manager. We do tend to use some of the same tests from year to year -- changing them if they don't work out well. But, eventually, after two or three times with a test, you've got a set of tests that are fairly adequate; and we want to use it again. So, we don't want them ripped-off. What we'll do for each unit, say Unit Seven, is this: even though an individual student will only take, at most, three forms of the same unit before he comes to see me, we will have four, five or six forms of tests available on each unit. So, a student will come in, and he will sign out, with the course manager, that he is taking Unit Seven, Form D, Copy 8. (We typically have ten copies of each of the forms for each of the units.) He signs that out, writes his answers on, as I said, a special answer sheet which gets left with the proctor after it's corrected, returns the test itself (the numbered test) to the course manager, and gets himself checked off. Then, he's no longer responsible for that particular copy.

This means that, at the end of every day, we can check that we have all copies of all forms of all the units. Since we started doing it this way, we have lost very, very few. I guess we lose

two tests a semester. We know where they are and who has them at all times.

E. Q. *What communication system is installed to inform other sub-systems; i.e., Registrar, computer, administration, etc., of the progress of each student through the overall system?*

Even though this course is self-paced and individualized -- PSI and all those good things--it is a bizarre course in terms of the College. It is functioning within a system that is very traditional. We make contact with that system the same way any other course does. In most cases, that just means a final grade sheet at the end of the semester. We've gotten to the point, however, where most of our students finish all of the units and take the final. A grade can be assigned without difficulty. A few students aren't done; and under some conditions, we will issue them an "Incomplete." In terms of recording within the course, it would just be of that final grade sheet at the end of the semester, like any other course.

The only other exception to that is for freshmen or students who are on probation. For these two categories, we have to send to the Dean and to the Registrar a mid-term report. This is done in a very arbitrary kind of way. At the beginning of the semester, we tell the students that anyone who hasn't finished a third of the units by mid-term (where mid-term grades are required), will receive a grade of "Unsatisfactory" at mid-term. Anybody who has passed more than a third will receive a "Satisfactory" grade. The students know this doesn't mean much because it's made very clear at the beginning. The report of "Unsatisfactory"

is, in a sense meaningless. The student hasn't lost any points as he would if he took a mid-term exam and got a "D", and then is in a position where the best thing he could possibly get in the course would then be a "C". He's not in that kind of predicament in our self-paced course. He's just been moving slowly; and, in fact, he and we know that if he now moves more rapidly, he probably can still finish the course and come out with an "A." So, the mid-term grade doesn't mean much other than as a warning that he is a bit behind. If he's behind for legitimate reasons, that's fine. He doesn't worry, and we don't. If he's behind because he's been negligent, then it's a kind of warning that says nothing more than, "Hey, Buddy, you ought to move a little faster."

F. Q. *What number of weekly hours are spent with students by the average faculty member?*

A. I've chosen to teach most of my courses on Tuesdays and Thursdays, which means we meet for an hour and a half each day rather than Monday, Wednesday, and Friday -- when we would meet for one hour, three times a week. So, technically, my course meets twice a week for a total of three hours a week. In fact, I've found this isn't quite enough time; so, I've extended both meetings to two hours each. The typical load for us is nine hours, or three courses. This would mean 12 hours of class time a week, plus office hours -- which might be two or three -- giving us a total of about 15 hours a week the average PSI faculty member might spend in direct contact with the students.

A couple of qualifications of that, though. The average load is 9 hours, but the College has a regulation (not for individualized classes, particularly, but for any course) that courses over 100 in enrollment count as two courses; so, if you were teaching a course with an enrollment over 100, that one course would equal two, and you would only have to teach one other. Your total course load would be two courses for the semseter. Most of my PSI courses do have an enrollment of somewhere between 100 to 150; so, typically, I teach two courses a semester, which really means eight hours in the classroom, plus my office hours.

Funny things happen with the office hours. I used to schedule many more, and I now find I don't need them. The students don't come into the office as much. I see them in the PSI classroom and talk individually with them in the classroom.

In the classroom, the atmosphere is very informal. There are people moving around, doing all kinds of things. Everybody is talking to everybody else. It's a relaxed, happy kind of place, and students talk to me very freely. We have good conversations there. I find that the students who are relaxed, animated, enthused, interested, and quite articulate in the classroom will come into my office and be tense, tongue-tied, and apparently intimidated. I think a professor's office is his own territory, and the student feels he is trespassing on it. The dialogue and conversation you have there are less than satisfactory. In many cases, it's certainly more satisfactory in the PSI classroom -- much more relaxed and much more friendly. So I find since I've started teaching PSI courses that students talk to me in the class-

room and don't come to the office. So, the office hours are not used that much.

I would comment a little bit about the four hours of classroom time for each course. That is to say that it is tempting in some cases to greatly expand the hours or even have a learning center which is open seven days a week, 24 hours a day. In many ways, it sounds flexible. It seems to be the ultimate in providing individualized attention. There are a couple of problems in going that route, however. One phenomenon that happens when you expand the hours is something that Pat Cost talks about in terms of the lonely learner. The student who can come in at almost anytime is likely to have a rather thin experience when he does come in. There won't be many other people there. Something does seem to come out of the interaction of the hustle and bustle of meeting other students and several proctors and being in an atmosphere where things are going on. I have heard -- while visiting Bob Toft at College IV — both the faculty and the students talk about students who have access to a great numbers of hours of their own choice. They, sometimes, will talk of the question of whether they are the only student enrolled in the College. It doesn't happen often. College IV is doing a good job in most respects, but this great extension of hours can lead to a "lonely-learner" kind of phenomenon.

It can also lead to the problem of procrastination. If you can take a test at almost anytime, then there's no point in particularly taking it at any particular moment. You can always put

it off and take it later. If there are liberal hours -- but curtailed within certain limits -- having missed that, you don't have another opportunity for a couple of days. People seem more likely to get up out of bed and actually go in at that time than if they could stroll in anytime, night or day. Something more liberal than just four hours a week would be suitable, but at some point in the expansion, you get to a point where procrastination increases beyond what it would be if the hours were more restricted.

One final comment on the number of hours spent with students in respect to having the course testing available just four hours a week. It is important for the instructor to be there. If you move to something that is more like a learning center, where students can come in even five or six hours a day at any time, there is just no possibility that the instructor can be on hand on all occasions. That may be fine for some kinds of individualized instruction. It doesn't fit neatly into the context for a PSI course. The notion of a personalized course is not one that means that the teacher has written a lot of modules and, is an unknown author who, once the course starts, has disappeared. He has a real function. He needs to be on hand. He should always be there, if possible. And, the only way for him to always be there during testing hours is to restrict those hours to a number where it is, in fact, feasible for him to be on hand. For me, again, four hours in any one course is about as much as I can meet because of other commitments.

G. Q. *What is the student-teacher load?*

A. Well, again, there's nothing special about the individualized courses. We're treated just like any other. The normal policy for the University is nine hours a semester, with the provision that if your enrollment is over 100 in any one course, it counts as two courses. Other than that, there is no specified numbers.

Our own department has an internal departmental regulation calling for each instructor to teach a minimum of 200 students a year. The same is true in teaching advanced senior major courses where the enrollment will only be 10 or 15 in specialized seminar topics, which cuts the numbers down very greatly for some of us. The rule, essentially, is saying that, if we want to teach senior seminars to small groups, we also have to teach a few large courses, too, to build up our individual enrollment to 200. Since my PSI courses are typically between 100 and 150 each semester, I just never have any trouble with that 200 load requirement.

H. Q. *Are there any special pay considerations involved?*

A. No. I wish there were. Almost every PSI teacher will say he works harder than he does in any other kind of course. I don't know why he doesn't get paid more. He should.

I. Q. *How is a professor's role changed as compared to those who are engaged in the lock-step system?*

A. For one thing, a teacher is no longer walking into a room, standing in front of the class and giving a speech. He's doing

something rather different. A look at the kinds of things that I do within the context of a PSI course that is my role, comes down to perhaps four things: I probably spend 50% of my time working with those students who have taken three forms of the quiz and still not passing it. After three unsuccessful attempts, they are sent to me; and we try to take a more precise diagnosis of what the problem is and more explicit information as to how the student can master the materials he's having difficulty with. Again, as I said, I'll very often write a special essay question that is hopefully on target with his problem area and send him off to work on just that.

Probably, 20% of my time is taken up talking with individual students about one of two things: either a student will come in and say — in spite of the objectives we've written, the procedures we've described, the special hints we've supplemented to the text, the study questions we give -- that there's still something that he doesn't understand and can I explain what "this" means.(Generally this question is quite specific with respect to some content part of the course. So, we'll discuss that prior to his taking a test.) Or, alternately, an individual student will come in and say that, while studying a unit on physiological psychology (he's a medical student; and, for him, there are special things about this unit that are interesting), he'd like to go further, to discuss something more, and so on. It's not something that you'd give a lecture on in front of a class where most people aren't pre-meds; but, for him, there's some content involved in that unit that connects with other aspects of his study that he wants to discuss.

So, we'll go off to the back of the room and sit for a while talking about that. Another student working on some units dealing with behavioral control and the issues of determinancy will find, as a pre-law student, that these issues raise other questions with respect to our legal codes or our penal system. He'll come up and want to discuss that; and, again, the two of us will go off and talk for awhile, not on something that we would lecture to a group with different career interests and goals, but on matters that are relevant either to specific course content where they are having trouble, or relevant to other courses they are taking.

Another 20% of the class time will be spent monitoring the system: Checking with the course managers to insure that tests are being filed, that records are being kept, that information is being entered on the outside of the student folders, that the test checkout system is functioning properly, and that the proctors all have the appropriate materials so that they, in turn, can use those to help the students. Very often, I'll just wander over and ask a proctor and student who are working together if they mind if I eavesdrop. They generally do, initially; but I do it often enough so that they recognize that it's one of my phobias. So, after a while, people get used to it; and I'll go and sit down and just listen to a proctor interview a student and see that that's going well. Since you are there in the class -- and that's one of the reasons why the professor should be there all the time -- you're getting an enormous amount of feedback from the course manager, from the proctor, from the students. If there are materials

that you think are clear but aren't, you'll find out. That allows you to revise them. If you have some proctor who, in fact, is not doing his job as well as he should, you'll hear about it from the students, from other proctors, or from the course manager. You need to be there to monitor this.

Two years ago, I had to go to a special UNESCO conference in Brazil right in the middle of the semester. I was away for almost a month. My course manager was very good, my proctors were good; and the course went right on without me for a full month. When I came back, I found that they had done a good job; but it had become a bureaucracy. Everything had become very rigid. In some cases, a little bit deteriorated.

To keep the course personalized, functioning smoothly, there's a monitoring job the teacher needs to do, and only he can do it. He needs to be there to do it.

So, I spend 50% of my time with those students that are unsuccessful after three attempts; 20% talking to students who are either having content problems, specific questions, or want to discuss how the content of the course make contact with other things; and 20% monitoring the whole system, talking to course proctors, course managers, students, seeing records are being kept, and so on. That leaves 10% of the time remaining. There are occasions when everything is going well, everyone's doing their job, no one has a question, and everyone is busy. I wander around feeling rather lonely, useless, and unwanted. Perhaps I'll walk up and try to talk to somebody and they'll tell me that they'd

love to talk with me right now, but they're very busy trying to pass this unit and that they have more studying to do. Essentially, they are saying rather politely, "Say, would you please go away and leave me alone?" It's an indication, I guess, that the whole system is working beautifully; but you do feel unwanted, unneeded, and unloved at times. What I do with that 10% of the time -- once I feel that I've set up something that no longer needs me and I'm being rejected -- is to pull up a chair and set up shop as a proctor, like anybody else.

Actually, I like to do that now and then anyway. It keeps me in contact with the proctors so that I can see what kinds of things they are doing, or should be doing -- what kind of problems they are having, particularly if they have new materials. It's a good occasion to see whether there are problems with those materials. So, whenever I write a new chapter or a new unit, I like to proctor just like any other proctor for awhile to see whether the materials are adequate or not.

So, acting as just another proctor takes perhaps 10% of the time. And that accounts for it all.

It's a very different role than giving lectures, but it's a very important role and, at least to the extent we're talking about a PSI course, the professor is a very important figure. He just does different kinds of things.

Of course, the role change I've talked about so far has all been directed toward the in-class role. There are some differences outside, too; and that is, in many cases, concerned with the PSI

teacher creating his own modules, his own units, his own study guides, and his own materials. This keeps him rather busy.

I suppose the traditional teacher can say, too, that he is writing his lecture notes, but most of us who have taught a course two or three times know that we kind of develop some standard lectures, and we probably don't spend much time re-doing them. In the worst case, we can walk in and give a lecture at a spinal level and get through. You can't do that in a PSI course. The materials have to be there, and that calls for outside work ahead of time. The materials not only have to be there, but by and large, they have to be good. In fact, they have to be almost perfect. There must be enough feedback to tell me where they are bad; and then, hopefully, I'll correct them and make them better. If the modules are not perfect, they at least need to be good enough so they function well. If I neglect this, it will lead to a total deterioration and disaster in the PSI classroom.

So, the teacher does have this new role of creating materials and writing materials that is over and above what the normal teacher has to do.

Part V

LEARNING RESOURCE CENTER

We don't have a Learning Resource Center at Georgetown. Perhaps one footnote to that is that about five years ago, one of the librarians decided that we should have a Learning Resource Center and managed to get a special budget appropriation of a few thousand dollars. It was set up as an experimental, first step in the basement of the library. I think she set up something like five carrels, various audio-visual equipment, a direct access to a TV screen, and so on. It was on a very, very small scale. There was no one particularly designated to run it. There was almost no software acquired to go with the hardware that was available; nobody was designated to service the hardware, so it broke down. There wasn't much to watch, anyway. It was not a very successful experiment. It certainly didn't prove to be a happy demonstration, and so a Learning Resource Center was never constructed.

Part VI

MISCELLANEOUS

A. Q. *If a student is to perform the activities comprising a learning module away from the campus, how are the hardware requirements monitored?*

A. In a sense, we just don't do that. The student has his study guide, his written materials; he can take those anywhere. But, when he has a laboratory unit, he has to go to a specific room, a specific laboratory, and conduct it there. We don't deal with off-campus hardware problems.

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. Until recently, we really didn't have a problem. Oh, I suppose the English and the Math Departments do some pre-screening as to where people should start, but I think I noted earlier that, typically, the Admissions Office has generated for us a highly selected student population. Since we have such a selected audience, by and large they are very, very well-qualified; and there just has not been too much need for remedial courses.

It has changed a bit recently; and I don't think Georgetown has handled it too well yet. It's really very recent that the

University began to recognize the responsibilities to the community in which it is located. Washington, having a very high population of blacks, was practically a national disgrace in that, until only three or four years ago, Georgetown was almost totally white. It was a rare thing to find a Black on campus. There's been a real effort to change this in the last three or four years.

The attempt to change this has been in two directions: one to search the Washington community or the nation as a whole for Black students who meet the same rigorous, high standards of the normal student population we admit. Some of these Black students have been located and admitted. This is a very highly selected group, though; therefore, there has been no particular problems in remedial courses. "Disadvantage" questions haven't entered in. But, we haven't been able to find enough of these students to serve the kind of community commitment Georgetown, as a University, should serve. So, starting very recently, a certain number of Black students have been admitted to the University who do not match the standards of the normal entering classes. It's created problems because, since we haven't met the need before, we don't have a system of remedial courses and special conditions that such students require. The faculty is somewhat reluctant to develop them; and the facilities and the courses just aren't there to help these students. The students aren't very happy because they are not receiving the help that they need, they deserve, and should have. So, it hasn't been a totally happy experience.

The few PSI courses that we have are enormously popular with this new group that's entering our College. We have compared PSI students with the Georgetown student population as a whole. We found that we have a disproportionately high percentage of Blacks in our PSI courses. It's one of the few places they do get individual attention.

Some steps towards remediation and special treatment that they need, we can't solve. Three, four, five or even ten PSI courses on our campus per year can't solve the general problem because it's a total-curriculum one. So, I think the PSI people have done the best job that's been done on campus with this group; but it's inadequate to the problem. The University, as a whole, has not done its best in trying to solve this problem.

C. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. In one sense, we haven't engaged in any promotion. PSI courses are identified in the course catalog as being self-paced; so students know what they are getting and can deliberately choose them. In terms of faculty activity, we haven't done anything more than to put the PSI label there so people know they are there, know what they are getting, and choose them if they want to.

If there's been any promotion at all, it's been by the students themselves. The enrollments for PSI courses have been going up. They have been offered now for about five years. The

number of such courses has increased every semester, and the number enrolled in all of the courses has gone up each semester. They are very popular. Students tell students, and the word is getting around.

The students enjoy the courses. They like them even though all have said they work harder in them. And, almost all will say they learn more. That word has gone, word-of-mouth, from the student to student. It's the student grapevine that's done the promotion for us. Students are coming in by droves.

D. Q. *Do you require your producers of learning modules to demonstrate competency in their area before employing them in your system?*

A. This, in a sense, doesn't apply. There are only these few individualized courses on campus. Everybody teaching such a course is doing it within the traditional system, and each person teaching a PSI course has developed his own materials and uses only them. So, the question really hasn't come up.

E. Q. *Do you have an educational technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

A. Yes and no. Of course, the offering of a workshop is one of the major missions of the Center; and we do it all the time. We do it all over the country -- in fact, all over the world. The Center has only put on two workshops at Georgetown, however. One was physically at Georgetown, but the participants in the workshop came from elsewhere. So, we put on only one workshop for the Georgetown faculty, and it was the greatest disaster we've ever

had. The Center now has probably offered somewhere between 15 to 20 workshops in the last couple of years. Most of them have been highly successful, if not a stunning success. At least they've all been good except for this one that we've put on at Georgetown for the Georgetown faculty. It probably comes down to a case of a "prophet in his own land." For two of us in the Center, we are not only at the Center but we are also professors at Georgetown. It doesn't work very well to tell other colleagues of the same faculty -- in either the same or different departments — how they should teach. It didn't work. It generated some animosity. As a policy matter, we won't do it again. I am happy to talk about PSI anywhere in the world except at Georgetown. I have no desire to even discuss it there.

A couple of comments on the workshops that we have. Often, on other campuses, we've experimented with different lengths and different kinds. I think we've learned something by doing it. One is that -- and it's just been a happy result -- out of all the people that have taken our workshop, something like 85% of the participants have, in fact, gone on to teach PSI courses. This is a reasonably good record. Of those who have gone on to teaching such courses -- we are now talking about 700 people -- only one that I know of taught a course that was something less than successful; or, in fact, went into the negative numbers. So, almost everyone who goes through the workshop and does teach the course later has had a rather happy experience with it.

Another thing about the workshops: we've given brief workshops and, essentially, just instructed people in the pro-

cedures, methods and techniques of self-paced instruction. From what we can tell, this is certainly better than nothing. It's better than just handing somebody a pamphlet to read and to try developing their own course.

Our workshops are, themselves, self-paced courses. So it's teaching PSI by PSI, if you will. In something like two or three days, you can offer a workshop that makes people quite familiar with the techniques, the problems, the methods, and so on; and, again, it's worth doing.

Even more worthwhile, though, is the slightly longer workshop, where, within the context of the workshop, the participants actually prepare the material that they will go on to use in their course. The number of people that go on to teach a course and the number of successes we find when they do is much higher when they've actually prepared some of their own materials with the guidance of the workshop staff, and in the context of the workshop. The more units the participants generate before going home, within the time of the workshop, the greater the probability that they will, in fact, go on and teach a course. Those who generate only one or two units are the people who have not gone on to offer the courses. Those who manage to write ten, twelve, or more units within the two weeks of a workshop, invariably go back to their own campus, finish what work there is to be done, and offer the course. We've found, just in terms of helping faculty prepare materials or courses in all kinds of disciplines, that we do seem to be able to help them through at least Unit Four,

possibly Unit Five. After they have written four or five modules or units, they've learned just about all that we can teach them. Beyond that, they can better critique their own work than we can.

Part VII

EXTRA COLLEGE ASSISTANCE

A. Q. *To what extent are off-the-shelf learning modules, commercially produced, used in this system?*

A. We don't use off-the-shelf learning modules. The few people who are teaching PSI courses at Georgetown have produced their own courses rather than using commercially available ones.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

A. We have not used outside consultants in producing our PSI courses.

Part VIII

PLANNING YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year; i.e., production of learning packages, developing of systems, etc.*

A. Wow!! Well, I'll first assume that you've got people who have some idea of what they are doing, they've mastered the system itself, and know what a study guide is, how to state objectives, and all of that. Let me use as an example a new course that I've developed for this year. I started last spring going through various textbooks that were available on the topic, ended up with the one I liked the best, and chose a series of outside readings to go with it because the book didn't seem to be complete. So, the first step was just to chose my basic materials. That, I had done by May. In July, I spent the month writing study guides for each unit, outlining the procedures, determining the objectives, writing the study questions, forming helpful hints, correcting the textbook where I thought there needed to be additions, writing the tests (four or five forms for each unit), and writing the proctor answer sheet (which, increasingly is perhaps the real key to the system). The better materials you have for the proctors, the better they perform; the better the proctors perform, the better the whole system works.

By mid-August, about six weeks later, I had the first edition of the course all laid out -- study guides, tests, proctor materials, etc. Then I got two of my students from another course who were around doing other things for the summer, to work through them. With just two students, we found where there were terrible errors, where my eloquent prose was totally inadequate, and so on. I corrected the program in terms of their comments and problems. Then, it went off to the office as raw copy, where it was put on ditto masters. At least the first time through, my own preference is to produce all of the study guides, tests, and the proctor answer sheets on dittoes. The easier I make it on myself to correct something, the more liable I am to do it. By mid-September, when the course started, all the study guides, tests, and proctor materials were on ditto masters.

Then, the course manager had to be chosen. Actually, I picked him the previous spring; so he was ready to go, having worked with me before. He started duplicating various units, a little ahead of the class, in sufficient but small numbers. We took these new units into class and found that almost none of them worked. Almost every page had to be revised based on the results of watching the first ten or fifteen students go through it. So, we cut new ditto masters as we went along; and the following day, when the class met, we had a better test, or a correction to the study guide, or new proctor materials. We spent most of that first semester correcting as we went along.

So, let's see where we are now. We had to choose the books, write the study guides and other materials, get it typed, and duplicated, and choose a course manager. The course manager had to set up the filing system -- which is simply just making sure that we had enough index folders so each student had his file and making sure that there was a filing case near the classroom where the stuff could be stored. I already had a course procedure sheet from the previous year that still worked pretty well; otherwise, that would have had to be written. I had to order the film for the first day of class; and in an earlier question, I described what I do on that very first day. Then, I guess, that's when we were ready to go.

What I have just described is really not a planning year; it's an installation of a new course by somebody who had already set up a system and knew what he was doing.

One of the things the Center does is work with colleges and universities who are thinking of implementing PSI for the first time, perhaps, in multiple courses, or even widely throughout the curriculum. We developed for that occasion something called "The Faculty Development Program." So far, I think three universities have contracted with the Center for that Program. One is the University of Alabama, the second is the University of West Virginia. At the moment, I've forgotten what the third was. Perhaps that's more to the point of what you wanted in the question.

Let's take West Virginia as an example. What they did was have one staff member (in this case, it was me) go in for one day and present a one-day workshop, for , essentially, the entire faculty. And, what was done that day was a presentation of the movie, a couple of short speeches, and then a couple of hours of sitting around in a question and answer period. It took care of the entire morning. In the afternoon, those that were interested came back and worked for about three hours on one or two units taught by PSI, about PSI, and learned just a little bit more of the basic philosophy, a few more details (but not many) of how the system works. By the end of the day, anybody who had attended that session probably could give a reasonably intelligent answer to the question of what PSI is, why it is done, and how it functions; but nobody was, by any means, prepared to start and create the materials, organize the course, and offer it. The intent of that first day was to expose the entire faculty to the concept and the system and find out who was interested in it. Out of something like 250 to 300 people that attended that first day, 42 indicated that they would be interested in trying PSI or something like it.

So, the initial presentation was followed up in the early spring, soon as classes were over, sometime in May, by a two-week workshop. Three of us went out to West Virginia and put on a two-week workshop where forty-some faculty of that University worked through the workshop I've talked about -- where people learn essentially the theory, the practice, the logistics, and the details of the system in the first four or five days, then

spend the last half creating materials for their own course, getting it critiqued by the staff members who were knowledgeable about PSI. By the end of the two-week workshop, something like 38 or 39 people had prepared a significant number of units on their own and indicated that they were, during the Fall semester, going to offer a PSI course. I think something like 37 actually did it, most of them with enough success that the University is planning, this spring, to offer the entire program all over again. This time, most of the PSI staff will be picked from within their own faculty. They are going to bring one Center member out to run the workshop, probably for the same reasons that I mentioned in dealing with Georgetown. It's often somewhat difficult for a faculty member to be heard authoratively on his own campus, even through he may, in fact, be as much of an expert as anybody else. So, that's how their planning year went. Once the workshop was over and people were off and running, they developed their own courses, tested them, and ran them through the first time -- much the way I described in my own case.

Part IX

IMPLEMENTATION YEAR

A. Q. *Please list the major activities and events that must be accomplished during the implementation year; i.e., field testing, evaluation, admissions, etc.*

A. I think, maybe, I've covered some of this is talking about the planning year; so, put the two together. I guess the most important thing is to keep those materials flexible, easily corrected, and not cast in stone or bronze or gold. There is some temptation to produce a finished product, have it printed and elegently packaged. Every step in that direction just makes it more difficult to correct and more difficult to be responsive to the feedback you get from students, proctors, and course managers on the adequacy and inadequacies at various points throughout the course. While a little bit of field testing has been done (in my case, it was just by using two students previous to introducing the course), much of the revision is done by correcting the course as you go. By-and-large, the very best students go through the units first, in the lead. They are the students who are quite competent, quite articulate, rather happy within the system, and very relaxed. They're often proctors as well as students if you are using an internal proctor system. And they are quite verbal. They take the units before anybody else, and they are quite willing to offer comments, criticisms, and suggestions. By getting their comments first, the "dittoes" can be re-cut that night. When the great mass of students hit any unit, it has already been revised two or three times by the leaders. It sometimes happens that the kinds of problems that the leaders have, in many cases, totally expose most of the faults of the modules. Some of the slow students coming through later will find still other things that need to be corrected; but, the number of corrections decreases rather rapidly as we go along. By the end of that first term, the materials are in quite good form -- provided you're constantly responding to that feedback. From there on, the second time around, I send it off, have it printed and bound, and sell it in the bookstore. (Again, just to save the department the cost of ditto masters and xeroxing.)

I don't know if there's anything particular to say about the evaluation of them. I evaluate them in terms of "do they work?" When students get stuck, I have to find a way to unstick them. Sometimes, this means that the questions are poorly phrased and, essentially, are bad questions. In other cases, it means the questions are perfectly fine; but somehow, the text, the study guide, the objectives, and the study questions have failed to prepare the student to meet it. So, when you find several students having problems, something needs to be corrected; and it's not always clear at first whether it's the test that needs the change, or the study guide. But, by staying in the classroom, keeping in contact with the proctors, it rather quickly becomes clear which

is which; besides which, there are some questions that you know you want to ask. So, given that the question is phrased in an unambigious and clear way, the problem is not to change the question, generally, but to change the study guide so that the students are prepared to answer what you know you want them to be able to deal with.

Admissions: Well, we've covered admissions already. I think people starting out to offer a PSI course for the first time have a tremendous advantage if they can offer that course, first of all, to a small number. It's fine to deal with 100 to 200 people the second or third time around, but the program is never adequate the first time. It isn't student-proof no matter how well you polish it and work on it and phrase it. Students will find difficulties. It's just logically more difficult to solve a problem when you have 100 or 150 people, all having trouble. It's just easier to iron out those bugs when you have only a few. As well as keeping the numbers small that first time, it is helpful if the class can essentially be volunteers. If the course can possibly be offered as an alternative to a concurrent, regular, lecture course open to a small number who wish to try it. Then, at least, that first time, when you've got other problems to solve, you're dealing with a group of people who kind of join you in the effort and haven't been forced -- kicking and screaming -- to do something that they're not enthused about. They volunteered. They are with you. It is easier to recover from the mistakes you're bound to have that first time.

So, in terms of Admissions, it's a good thing if you can have it on a voluntary basis, where the students choose it as their particular option.

Part X

BOOKSTORE

I can't offer too much here. As I said, we don't have too many modules for sale. The study guides, after they've gone through one or two revisions in ditto or draft form, are then printed.

Once they're bound, however, we have them published by the MSS Information Corporation, one of those small companies that will, provided you have a need for over 80, take any materials you have and print them, bind them, and establish a price. Then, they are sold in our Bookstore like any other normal textbook. So, whatever few PSI materials are handled by the Bookstore, the price is determined by MSS Information Corporation. As I recall, you sign a contract with them, and there is a royalty provision after several thousand study guides have been sold. If you're using them, alone, in just your own course, you're never going to get royalties. As I recall, the study guides for the introductory course that I am now using is priced at $3.75, priced by MSS.

Part XI

EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel, and other components?*

A. Well, we've done several things. The department does offer something like five or six sections of introductory psychology each semester. Only one of those is a PSI section. The others are taught by four or five other department members in a traditional lecture format. Frequently, we'll combine with one instructor or the other and agree beforehand to give a joint, common final. It's a crude kind of measure and not terribly eloquent, but we have done it almost every semester. We generally come out almost embarrassingly ahead, in terms of total scores. It seems to have no effect on the colleague who teaches by the lecture method. He feels a little hurt, a little resentful, and goes right on lecturing!

The second form of evaluation is from the students. As they finish, or at the end of the semester, they fill out the regular student-evaluation questionnaire for the Rank-and-Tenure

Committee that the students fill out at the end of any given course. There is a problem with that, however. The questionnaire is based on standard courses. Some of the questions on that standard form really don't apply to a PSI course. I think, as I recall, there's a question on there that asks whether the teacher appears composed as he gives his lecture. Well, to the extent that we're not doing very much lecturing, if any at all, it's a difficult question for the students to answer.

There are other questions that lead to odd kinds of responses on the parts of the students. You get students giving a PSI teacher a very, very high rating on "Did he seem to care about my individual problems?"; "Did you feel that the instructor was attentive to your needs?" ; and so on. Another question, "Did you find the instructor helpful?" gets very high ratings. You might even have a question on there such as, "Do you feel that you got to know the instructor?", and the answer is mostly yes, very well.

But then there will be a question something like, "Do you feel that the instructor influenced your opinions?" Very often, the rating will come out quite low in that category.

Students tend to forget that the major medium of influence, the study guides, were written by the professor. They rate the written materials as much more influential than the professor himself. In fact, the teacher is exerting more control, more influence via his written performance than through speeches and lectures, but the student tends to forget that these materials are part of the professor's influence. So, the normal questionnaires

that are appropriate to traditional courses are rather tricky to use in a PSI course -- although we do use them.

The people at the University of Austin did develop a special questionnaire. The Tests and Measurement Center out there developed a special questionnaire for PSI courses. We've obtained permission from the University of Texas to use that questionnaire, as well. So, the students, at the end of the semester, fill out two questionnaires: one the traditional -- from our Rank and Tenure Committee, suitable to traditional courses -- and, second, one developed specifically for PSI courses by the University of Texas.

On the whole question of evaluation, we do need to use the jargon here, I suppose, and distinguish between the formative evaluation (which is kind of responding to the feedback you're getting each day from the students and correcting the program until it works) and the summative evaluation at the end of the course.

Each new ditto master that replaces an older, faultier, form is (in a sense, I suppose) in response to one kind of evaluation.

The summative evaluation at the end of the course, traditionally has been along the two lines that I've mentioned: comparison of final exams of students in a PSI course vs a traditional course, and the comparison, or preference, in terms of the student questionnaire, their likes and dislikes, or happiness with the course.

Neither kind of comparison is particularly elegant. The comparisons made in terms of accomplishment are never totally convincing. There are certain experimental controls that are almost impossible to institute to make the experiment totally pure. As I pointed out in the "Germinal Papers," it's a kind of comparison and a kind of experiment that's been done over, and over, and over again, at almost all levels of education, with all kinds of disciplines and in all kinds of institutions -- from Harvard, to Texas, to small colleges to large universities, state, private, community colleges, and so on. We keep getting the same answers: (1) that somewhere between 80 and 90% of the students prefer PSI and the other 10 to 15% hate it; and (2) that, by-and-large, students do as well, generally somewhat better, sometimes statistically significantly better than in traditional courses. As far as I know, there is not a single study on record yet that shows that the PSI students have done less well. Interesting?

They're not elegant studies, though. There are faults with all of them. But these comes a time when so many studies say the same favorable things we begin to believe them. I think most of us who have seen (now perhaps 150) of these studies all saying the same thing not only came to believe them, but also have gotten bored by the findings. There aren't too many people who are now replicating that study over again; with 150 of them published, there's little reason to work like the devil to provide test number 151!

The whole trend of research of PSI seems to have changed from the rather unsophisticated, self-congratulatory comparisons, The more recent research, in the last year, has turned towards what has been termed a component analysis of the system. Essentially, trying to evaluate what characteristics contribute to the success (we now seem to think and believe that we have demonstrated that it has), experimenting with things like unit size, number of units, the importance of review, comparisons between internal and external proctors, things of that kind. This component analysis is a very different kind of evaluation of the system itself. Presumably, it eventually will tell us what the critical elements are that make the course successful so that we can either expand the system or streamline it, or modify it, or change it, or improve it one way or another -- or even not improve it.

Part XII

MULTI-MEDIA MATERIALS

It is my personal opinion that there's a lot less to multi-media than meets the eye. Many professions or many sciences have something called (sometimes by a different name) Morgan's Cannon which essentially says: "Let's use the most simple explanation we can in a descriptive level and go only to more complex explanations as we find that simpler ones fail." I guess that's kind of the way I feel about instrumentation — that there's no merit in it of itself (or almost none). This applies to slides, movies, film loops, computer terminals, television systems, or whatever other fancy automatic instrumentation has been sold to the American Educators. That doesn't mean that they don't have a place. That doesn't mean that I have anything against them. It's just a caution that they are very expensive. They are difficult to maintain. They break down a lot. It's simpler to use printed media, in most cases. When it's not simpler, then fine. Let's use all the instrumentation we can bring to our command.

For example, printed matter, to take a gross analogy, is not a simple medium for somebody who is blind, and so we had better use tape recorders, or other kinds of media presentations. Certainly, in Biology, where Postlethwait developed his audio-tutorial, there are kinds of processes in living organisms that need to be seen through a

period of time, and it is inconvenient to mount laboratories where these processes are constantly available for students to view on a self-paced basis. But, yet, the processes needed to be seen — fine, films are useful, of course. They serve a function; they are needed; let's use them. But I do have a bias. Let's use our machines and our media when they are needed because we can't do it any other way. Let's not use them because we happen to have a room full of machines and now have to justify why we bought them in the first place. Essentially, we are creating a job when there really isn't one there. There probably is a small temptation to make an arguement for at least presenting some variety, relieve boredom, maintain interest, and so on. It is probably, somewhat, true. Some of the media can help, but most of the studies I know indicate that students quickly tire of those instruments. The advantages of using them couple of slide shows, a couple of film loops, one or two lessons on a computer terminal, and by the time we have used that much, they probably don't add much stimulation as media any longer. Again, they should be used when they add something to the instruction that can't be presented in a more simple cost-effective way. When we can do it, on the other hand, through the printed media, it's cheaper, easier, less trouble, provided it's equally effective. Why go to more complex systems when simple ones will do.

Perhaps some of that bias comes out of the fact that PSI was developed in Brazil. Not only were there not many instruments, available, but also, most of the time there was no electricity to run them if they had been there. The power supply, even in the major cities in Brazil, is somewhat hit and miss.

Dr. Sherman

Having said that, I repeat that I have nothing against media. Any College or University or campus that is fortunate enough to have a vast supply, already purchased, might just as well use them. There is no reason that much of the study guide material cannot be presented in other formats. If the instruments are available, fine, use them. If they're not available, I'm not convinced that it is worth spending a great deal of money to acquire them.

CAMDEN COUNTY COLLEGE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. JOHN GALLAGHER

On Individualized Instruction

January 16 -- 17, 1975

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was award-d a Grant by the Fund for the Improvement of Post-Secordary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campput to advise Professor Mario Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Dr. John Gallagher, who visited the college in the role of a consultant on January 16, 1975.

Dr. John Gallagher is currently Vice-President for Academic Affairs at Brookdale Community College.

Since its beginning in 1969, Brookdale Community College has developed an educational program designed to meet the needs of the

the individual student. The report which follows indicates some of the most significant elements of Brookdale's approach to teaching and learning.

Prior to becoming Vice-President in 1973, Dr. Gallagher served as Dean of the Institute of Applied Humanities at the same college. His previous experience includes teaching and service with the instructional resources unit of the State University of New York.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least eight to ten consultants. The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report, that will be presented to H.E.W.

I. ADMISSIONS

A. Q. *How does a student apply for admissions to your school?*

A. A student applies for admission to Brookdale Community College in a fairly traditional manner. Interest in the College may be generated through contact with high-school counselors by the College Admissions staff, through brochures distributed throughout the county, through newspaper advertisements concerning the College, and through many other such standard recruitment procedures.

What is important in this process and what is different at Brookdale Community College relative to other colleges is the fact that throughout the recruitment process the students are made aware gradually of the nature of the college and of the fact that it does pursue an individualized-learning approach. Obviously, the prospective students cannot fully understand the implications of this, but it is indicated throughout recruitment materials, that the student will be following a method of instruction and a method of learning that is individualized rather than lock step.

I believe it is important that this information be part of the admission, and prior to that, part of the recruitment process. It is important because, if we see college as a different kind of experience from that of elementary or high school, then that information should be shared with the prospective students from the beginning.

Brookdale sees college education as, basically, a different kind of experience from that at the elementary and high-school level. College has as its purpose to provide two types of learning experiences: the first type is to help the student prepare for a career; the second type of learning experience is to help human beings become more full and more complete, better-rounded individuals prepared to live their lives in society. It is clear this means that the educational programs of the college have two major segments: the first is the career training or career education; and the second major segment, commonly called the general education program, is that which fosters the human development of the students.

Recruitment materials, then, would indicate this basic approach and indicate the fact that the college does not try to merely continue the process of elementary and high school education by marching the student through a series of the same required courses for all students, building upon high school courses

and continuing the cycle upward. Rather, college is a break from that cycle of course-upon-course. It is a break in which the students now find themselves able to concentrate on two major elements of human development; namely, preparation for a career, and preparation for life.

Again, as part of the recruitment and admissions process, these aspects become clear through the fact that, from the beginning, the students learn that when they are admitted to Brookdale, and register as students, they will be signing into a particular institute and a particular learning center.

Brockdale's academic programs are divided into three institutes, and the three institutes are sub-divided into learning centers. The basis of association throughout is career groupings. The three institutes are the Applied Humanities Institute (which contains programs in those careers that apply humanistic studies to life), the Human Affairs Institute (a grouping of those careers which apply the social sciences to occupations and careers) and the Natural and Applied Sciences Institute (made up of those career programs which apply the sciences and technologies in various occupations and careers).

The learning centers within these institutes (there are 11 altogether, four each in two institutes and three in the third) are more specific career groupings. These 11 learning centers are the following.

In the Applied Humanities Institute, there is a learning center for the creative arts that gather together the careers in music, art, theater, and the like. There is a learning center for the communication arts in which the student pursues reading, writing, foreign languages and studies which can improve their general communication skills for careers in which they are interested. Finally, there is the Mass-and-Visual Communications Learning Center which prepares the students for careers in the mass media of journalism, television, film production, graphic design, and so forth.

Moving to the Human Affairs Institute, there are four learning centers. One is the learning center for Business and Management in which there are career programs in accounting, management, marketing, and secretarial science. Another learning center is that of human behavior in which there are career programs in education, psychology, and the like. A third is the Cultural Development Learning Center in which the student learns those things which prepare for a variety of careers including American history, western civilization, and the general development of culture which is applicable to many different careers. Finally, there is the learning center for Public Administration, with such programs as law enforcement and its related preparatory studies of sociology, economics, and so forth.

In the Natural and Applied Sciences Institute, there is a learning center for Allied Health, with programs in Med Lab Technology, Nursing, and Respiratory Therapy; there is a learning center for

the technologies, with programs in drafting, electronics, and so forth; there is a learning center for logic systems with career programs in computer science; finally, there is a learning center for the sciences in which biology, chemistry and the like are studied.

The students, from the time of recruitment right through the process of admissions, are learning about a variety of career programs in which they may enroll; and such enrollment relates them to a specific learning center within a specific institute.

Each learning center also offers a variety of general education courses which relate to the specific career programs; and the students select these on the basis of their human development.

B. Q. *What are the admissions requirements?*

A. Pursuing the general theme of admissions, the students express interest in being admitted to the college by writing or by coming to the Admissions Office. The admissions requirements are basically the same as those for other Community Colleges in the State.

The College has an open admissions process. It is an open door college and carries this through with all of its usual ramifications.

C. Q. *What are the record-keeping forms and procedures used in the admission sub-system?*

A. The forms used are fairly standard forms.

D. Q. *When the student leaves the admission sub-system, what proof does he carry with him that he has been admitted to your school?*

A. When the students leave the admission sub-system, they have a document indicating that they have been admitted.

II. REGISTRATION

A. Q. *Where does the student get advice about scheduling, curriculum and courses?*

A. Having been admitted, the student now goes to a Student-Development Specialist (SDS). This is the title used at Brookdale for what is traditionally the counseling person. However, at Brookdale, the Student Development Specialist is seen as a person who helps the student proceed in an individualized-learning environment. The SDS is, therefore, not merely a resource for the student with problems.

Every student goes to his own SDS to work out his Student-Program Plan. Individualized learning, in our view, requires a document we call, "The Student-Program Plan." It maps out for the students their program at Brookdale Community College.

The Student-Program Plan is a written document worked out by the student in collaboration with his/her own SDS who is assigned to the various learning centers and the three institutes of the College. Since there are 12 in total, three or four are assigned to each of the three institutes.

Having expressed, during the admissions process, an interest in a particular career program, the students go to that Institute and begin to work out their Student-Program Plan document.

The first point to be considered usually is the career in which the student is interested. When Brookdale uses the word "career" it uses it in the current and broad sense; that is to say, the kind of work that a student would like to do throughout his life or at least initially, . Such a career can be capable of entry with a one-year certificate, a two-year degree, a four-year degree, a master's degree, or more. When we spoke of career programs before, this was the sense in which this word was used; and all Institutes and Learning Centers of the College are related groups of career programs in which the students prepare themselves for a specific type of career, whether that preparation be short-term or long-term. Therefore, whether preparation consists of having a two-year degree from the College or enrolling in a transfer program, the student will be prepared for that career.

A student, therefore, now has the admissions document in his hand, approaches the Student Development Specialist and begins working out his Student Program Plan. The Student Program Plan tackles the question of career selection and, then, moves into the general education course selection.

As indicated previously, human development is the other major aspect of study at Brookdale. There are no required general education courses whatsoever. Individualized learning means, at Brookdale, that the student selects his career program and also selects those courses which will foster his human development and prepare him for life in our society. No specific course along these lines is required.

The College's official involvement in this process is through the Student Development Specialist. All course selection is worked out by the students in collaboration with their SDS.

One element which should be mentioned at this point is that, as the students meet with their SDS, they go to the Test Center and take a series of entrance tests. These tests are not for entry in the sense of determining whether a person may or may not be admitted to the College; they are, rather, a tool to help the students know themselves as individuals and to help their SDS know them as individuals so that the course selection process, which we are currently discussing, may be enhanced through this type of information.

All new students who are new regular students, that is students who are interested in a degree, take the battery of entrance tests, at least those that deal with reading, writing, and mathematical skills. This is to aid the SDS in helping the students in their general-education program. In addition, the Test Center has available a variety of career-interest tests designed to help the students know themselves better and designed to help their SDS know them better, relative to their career program choices or selections.

Every new regular student must have passed through the Test Center and taken this battery of at least the diagnostic test; that is, those in reading, writing, and mathematics as part of his/her work with the Student Development Specialist in planning the first term at Brookdale.

When this planning process has been completed, the student has worked out the first term at Brookdale, by selecting a program and thereby selecting a Learning Center and an Institute and by selecting a series of general education courses which, in his judgement and that of his counselor, will help him/her as an individual to become more prepared for life and life in our society.

Students then go to a registration desk to register for their courses.

The role of the SDS is far more than a problem-solving role for the student who has family problems or other

such problems. There is a relatively large number of SDSs at the College because an individualized learning process requires this kind of planning for the student, as an individual, which in turn requires resources for this. The Student Development Specialists are assigned to a number of students and are responsible for the planning process indicated. Their signatures are looked for by the registrar in the registration process.

B. Q. *How does the Registrar know that the student has been authorized to enter classes for which he is registering?*

A. As the students approach the registration desk, they must have in hand the signed document from their SDS for each course chosen. In addition, they must have in hand the test results from the Test Center in the form of a print-out.

C. Q. *What are the forms and the record-keeping procedures involved in the registration sub-system?*

A. The registration clerk must verify for all regular students that their SDS has signed off for all of their courses. In the case of new students, they must have in hand the document from the Test Center establishing that they have been tested.

A relatively small point might be mentioned here. It has been our experience that both the Student Program Plan and the test results need to be presented in the registration process. For a period of time, the students, as they went to register, needed only the signature of the SDS and not the test results in the case of new students. It was assumed that the SDS would evaluate the test results and use those results as part of the planning process. Since, however, there are 12 Student Development Specialists, it became somewhat of a problem, with 12 persons having the power to wave the entry tests, where appropriate, and having the authority to use the tests without some central check on this process. Currently, the test results as well as the SDS sign-offs on all course selections must be presented in the registration process. The Director of Admissions and Records has the responsibility through his staff, therefore, to see that all new regular students are tested. The check on this is the possession of the document from the Test center and, of course, to see that all students have an SDS sign off on all course selections in the form of a signature on the registration form or in the form of the Student Program Plan, which the student carries with him and which is signed by his/her SDS.

All of this is by way of indicating that, from the beginning, the individualized learning at Brookdale emphasizes the role of the individual student as a human being in selecting his/her own career and, also, in planning his/her general education program for human development. The SDS is the primary resource of the College in helping the student through this process.

D. Q. *What proof does the student have, upon leaving the registration sub-system, that he has been: 1. admitted to school; and 2. gone through the registration system?*

A. The student has a registration form signed by the counselor. The line for registration passes from the Registration Clerk to the Accounting Clerk for the payment of tuition.

E. Q. *Can a student register at anytime during the year?*

A. Another point which enters here is the fact that registration can take place at anytime during the year. While this point is, in some ways, part of a larger element, I will discuss it here because it is critical to individualized learning.

Just as individualized learning at Brookdale involves a large degree of free choice and selection in the General Education Program , and just as it provides individualized guidance through the roles of the SDS and through the Test Center (which is set up to help the student know himself) so also does individualized learning at Brookdale mean a registration process in which time is left to the individual rather than worked out for all students.

The concept time, then, is a critically important one for individualized learning. In a lock-step pattern, a term is defined in terms of number of weeks or days; and every student proceeds through the program on that basis. Individualized learning means a break from that process. It means, at Brookdale, that a student who enters a course may complete the course as early as his talents, his energy, and his time constraints allow. Should he complete a course early, he is able to join another course as soon as he completes the prior course.

There is a standard course load of 15 credit hours during a long term and 7 1/2 credit hours during a short term. A student, however, who completes a course early, may join another course if a seat is available. This process is called Continuous-Progress Registration.

Courses which have this capability are identified in the Master Schedule and in the catalogue. All Continuous-Progress Registration is on a space-available basis and students are eligible for it only if they remain within the course-load restrictions indicated. This means that, if a student is carrying a full load he/she must successfully complete a course before joining another course.

A Continuous-Progress Registration is essential to an individualized learning program because only thus can students move truly at a pace suited to them as individuals. On the other hand, it is a difficult process to use because it has obvious complicating elements in the Admissions and Records Office, and it obviously requires a high level of individualized learning materials available in

courses if students are to start courses at times other than the beginning of the term.

Just as Continuous Progress Registration means that the student can join courses at a variety of times throughout the year, and not only at the opening of terms, so also an individualized learning approach in terms of registration means that the student who needs more time than the standard term should be able to continue his study and complete his courses at a later date. At Brookdale, this is called Deferred Credit. The student does not earn credit at the close of a particular period, called a term, but needs more time because, for him , learning is taking place more slowly than for others. Individualized learning means that students can take more time and defer the earning of credit to a later date. This is the opposite end of the spectrum from Continuous Progress, which is geared to help the student move more quickly when the student is able.

In order to earn Deferred Credit status, the student requests this on the appropriate form. Approval from his faculty member is needed to continue at the end of the term, to work between the terms, and to continue into the next term. When the student does this, he/she is considered a Deferred-Credit student until such time as the course is completed and credit is earned. If the student's work continues into the next term, the courses carried on a Deferred-Credit basis count as part of the overall student load; therefore, this limits the number of new courses which may be taken, on the basis of registration, for the next term.

Again, individualized learning, which involves taking longer to complete courses, is called Deferred Credit. Ability to register at anytime is called Continuous-Progress Registration. Some students may have the competencies and skills of a particular course without requiring an extensive amount of time spent in the course. Brookdale makes available several avenues of approach in this situation.

If a student is registered in a particular course during a term, she/he may "test out" at anytime by demonstrating the competencies and the outcomes of the course.

Another version of obtaining the same result is called "Credit-By-Examination," in which the student signs on to take the final course examination or course-outcome demonstration without spending any time in the course. If the student is able to achieve the course outcomes, credit is earned for the course.

All of these -- namely, "Continuous-Progress," "Deferred-Credit," "Testing-Out," and "Credit-By-Examination" -- are elements required in what Brookdale sees as individualized rather than lock-step learning.

Credit is a symbol of achievement of outcomes of learning. If outcomes of learning are determined, then the achievement of those

outcomes, the achievement of those learning goals, is rewarded by the reception of credit. This understanding is very different from a definition of credit in terms of time and space.

When we analyze the use of the term credit, in traditional college terminology, credit really is very often used as a time-and-space term. The credit is earned by 15 weeks or more of instruction, one hour per week. A three-credit course meets three hours per week over 15 or more weeks.

Upon analysis, we see that this definition is either in terms of what a faculty member does (namely, a three-credit course means that he lectures three hours a week for 15 or more weeks to a body of students), or it is a time-and-space definition on the part of a student. To earn three credits, the student must work so many hours per week in a given place.

Certainly, these kinds of understandings, in terms of what a faculty member is expected to do as part of his contract and what a student is expected to do in terms of learning, are appropriate considerations. Nevertheless, in an individualized learning environment, credit cannot be defined in space-and-time terminology, but only in terms of the achievement of learning outcomes. This is obvious from the fact that no individualized learning program is possible if the time and space are determined for learning.

An individualized learning approach requires that we leave the time to the individual needs of the student; and corresponding to that, leave the space to the individual needs of the student.

In this kind of an environment, it is necessary to define credit as a symbol of achievement of learning goals or learning objectives; and these become the critical point upon which all the rest depends.

It is immediately of importance to determine how a credit, or three credits, for a given outcome is specified. There is no easy answer to this; but basically, what is a legimate outcome for one credit, two credits, or three credits comes from a mix of considerations that are carried on by faculty members.

In planning courses, faculty look at objectives or outcomes in peer colleges, that is to say in other community colleges, for a given course. They also evaluate the appropriate outcomes for a three-credit course on the basis of student response. They have, in addition, the outcomes or the achievements that are required for the career, where a course is part of a larger career program. Such considerations go into the determining of what is the appropriate outcome for a three-credit course.

This is a complex issue and certainly not an easy one. Nevertheless, it is far better than determining credit merely in terms of time and space , which is incompatible with an individualized-learning approach.

While still on the subject of registration, it is important, again in an individualized learning environment that personal data concerning all students be gathered as part of the registration process.

At Brookdale, a rather extensive questionnaire is given to all students who register. It concerns background, experience, family background, and all pertinent information that will help the college to know the student body. The information will not be used to pre-judge them; this statement is printed on the form itself. It is also requested of the student, not required, in order to avoid any connotation of restrictive enrollment on the basis of demographic data.

Most important, this information should not be allowed to become a self-fulfilling prophsey, in which a poor background, on entry, fulfills itself by poor outcomes of learning. Nevertheless, setting aside those dangers, the gathering of such information is critically important in an individualized learning environment. Without this information, overall college planning becomes impossible because we do not, in fact, know the student body. Individualized learning can only take place when every effort is made to know the make-up of the student and to plan the total program with the consumer, as it were, in mind.

One last point under this question. Where possible, the registration process should be "on line," as at Brookdale. On-line registration is carried out through computer terminals which are handled by admissions and records clerks who are able to register the students directly.

The terminal readings indicate what courses are open or closed, the seats available, and so forth. This process is of importance, although individualized learning programs may take place without it.

F. Q. *Is there a minimum and maximum number of courses for which a student may register?*

A. There is a standard course load of 15 credit hours during a long term and 7 1/2 credit hours during a short term. A student, however, who completes a course early, may join another course if a seat is available. This process is called Continuous-Progress Registration, spoken of previously.

III. BURSAR

A. Q. *How does the Bursar know that the student who is attempting to pay for courses has been fully admitted and registered?*

A. Since Brookdale's registration is on-line, through a computer terminal, the answers to your questions are fairly routine.

The student has a registration form signed by the counselor. The line for registration passes from the Registration Clerk to the Accounting Clerk for the payment of tuition.

B. Q. *What forms are involved?*

A. The registration form. This form is in triplicate, and there is an appropriate form that goes to Accounting.

C. Q. *What is the tuition amount charged for each course or module?*

A. Tuition is $200 for each term or $15 for each credit. There is no separate tuition for parts of courses. Many courses are of variable credit; that-is-to-say, one, two, or three credits, in which case the student's tuition is based upon the $15 per credit.

D. Q. *What form (or proof) does the student have that he has paid for a specific module?*

A. There is no separate charge for modules, as indicated above.

IV. FACULTY

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. The student reports to class after registration. The faculty member, on the opening day of the term, receives a computer print-out of all students in his courses and sections. The student needs no other form, since the print-out contains his name.

B. Q. *What sort of orientation does the mentor give the entering student?*

A. Orientation is of great significance and most important in an individualized learning environment. At Brookdale, there are several stages of orientation of new students.

First, before the term begins, all students come on campus to plan their learning programs through the Student-Program-Plan spoken of before. This takes place in collaboration with the Student Development Specialists in the area to which the students have been admitted.

While on campus for interaction with the SDS, the student also plans the testing process, also spoken of before, and meets people on campus.

Secondly, immediately before each term, all new students come on campus for one day. On this day, there is an orientation in each of the Institutes for all new students. Programs are described; student activities of the Institute are described. The counseling program and all elements of the total program are reviewed on this one day.

Thirdly, the entire first week of each long term is, in a sense, an orientation to individualized learning. Each faculty member reviews, during that first week, the process of individualized learning which I will describe in a moment.

Since the course is beginning during the first week, the orientation takes place by way of "doing." It is not merely a narrative of what Brookdale is like but an involvement in the first week of the course and the drawing out from that of how the college teaching and learning process takes place.

Fourthly, Student Development Specialists have group sessions for new students every week or two during the first term. Students who are counseled to do so participate in a kind of ongoing orientation.

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, the completion of modules, and the issuance of the next sequential module?*

A. The most important thing that happens at the beginning of the term is the distribution to the student in each course of what is called "The Learning Program of the Course." The Learning Program of the Course is that document, which every course taught at Brookdale has, which identifies for the course the outcomes of the course, the various strategies available in the course, and the evaluation criteria by which the students will be evaluated.

We call this document the Course Learning Program. It is the fundamental document used for individualized learning. The reason this document is fundamental and of the greatest importance for individualized learning is because, in my opinion, the freedom to choose from a variety of learning strategies or procedures is directly dependent upon the determination for each course of what are the outcomes to be achieved in the course, or the competencies to be developed, or the skills to be learned. If course objectives, as these are called, are not worked out for courses, there cannot be freedom of selection. In fact, the course then becomes defined in terms of time and space. This course, for example, may be defined as 15 weeks, three hours a week of meeting with an instructor. In that kind of an environment, no outcomes are defined and no learning achievement is identified. The course therefore, becomes defined in terms of time and space.

Quite contrary to this, in an individualized learning environment, course outcomes are determined at the outset. Once there is a clear definition of the outcomes of the course in terms of achievement or competencies to be developed, the instructor is able to allow the student a wide range of freedom in selecting from a variety of procedures for learning. This point is of critical importance because of the strict co-relation between outcomes determined and freedom or flexibility in the selection of strategies or procedures.

It is my opinion that in the absence of a determination of outcomes for courses, faculty find themselves forced to be concerned about time and space, having students present in a room for a period of weeks for certain kinds of activities to be sure that "They have taken the course." Quite contrary to this, if outcomes are determined, then the symbol of achievement of outcomes, which is credit, is granted whenever there is a demonstration of the achievement of the determined objectives. "Whenever" means freedom and flexibility as to time.

This may take place in a brief period of time for those who move quickly; it may take place through testing out of a course on the part of those students who have already possessed the competencies; it may take place through credit-by-examination. Indeed, it may take place in a period longer than the time of the course when the student requests deferred-credit status and continues to work to achieve course outcomes after the term is over.

Time, therefore, becomes of secondary significance because the outcomes are well defined and agreed upon and credit is given when the outcomes are achieved. Space, too, becomes of secondary importance because if the outcomes are determined and defined, then where the student carries out the procedures and strategies to achieve those outcomes is of secondary importance.

A wide variety, therefore, of procedures may become available. The student has flexibility to use one or other of these procedures and the unifying force is that all students who earn credit in a given course achieve the course outcomes.

The make-up of the learning program is as follows: the learning program for each course first states the course outcomes, what it is that the student will be able to do if he takes and completes this course. It then breaks down the course into a number of modules or units which may be anything from three to ten, or possibly even more modules. Each unit has by itself a unit outcome, a variety of strategies or procedures available to achieve the unit outcome, and a set of evaluation criteria whereby it will be determined whether the student has achieved the unit outcome.

The overall document has, basically, a systems design: outcomes, procedures, and evaluation criteria. Each is separated from the other so that outcomes are defined in terms of competencies, skills, or the kinds of things that one is able to do. Strategies are clearly separated from these because strategies will vary considerably, depending upon the course and depending upon the kind of student and faculty involved.

Finally, the evaluation criteria are simply ways of knowing whether outcomes have been achieved.

This learning program is distributed during the Orientation, in the first week of the term. It is either given out in its entirety, and some faculty do this, or the first unit is given out; the second unit is given only when the first is completed. At Brookdale, we leave considerable freedom in this to faculty.

Two very practical points need to be made when speaking of course outcomes. First, at Brookdale, the students determine for themselves not only which course will be taken (in collaboration with Student Development Specialists) but also the level at which the course will be completed.

The credit level is the level of achievement of all essential outcomes of the course. There is no failure grade at Brookdale. All students who com-

plete the course objectives receive credit. Those who need more time may apply for deferred credit. Those who do not work sufficiently during a term or beyond a term become inactive.

Failure is not recorded because it is the conviction of the College that what a student achieves should be recorded regardless of how long it takes to achieve it. Failure-to-achieve is not recorded. The credit level represents the essential ingredients of the course, the achievement of all fundamental and essentially required outcomes.

Beyond that is credit with honors and credit with high honors which are, as it were, refinements for the levels of achievement beyond the credit. In an individualized learning environment, this type of grading has significance. It stands in sharp contrast to averaging, or grading on a curve, or setting up any comparable competitive system in which students compete with one another.

In an individualized learning environment, the achievement of course outcomes is rewarded by the symbol of achievement which is credit. Hopefully, all students will achieve credit. There is no need for students to compete with one another and to be marked with some type of curve that places Student "A" in relationship with Student "B." In an individualized learning environment, what is important is that all students achieve that which they set out to achieve.

Secondly, an important point concerning this matter is the fact that, in an individualized learning environment, responsibility on the part of the individual is fostered when the student registers for a course on the basis of knowing the outcomes to be achieved. The student registers on the basis of the knowledge of what he will be able to do at the conclusion of this course. In a traditional pattern he registers for a course merely on the basis of course title and number and then finds out what he will be able to do through the course only by taking the course. This lock-step type of approach does not foster individual responsibility which, in turn, is fostered by free choice and selection on the basis of knowledge before the fact.

The course outcomes are available to all students before courses begin so that students know what skills and competencies will be developed through taking the course. They make their course selection on this basis.

One of the very significant problems in the determination of course outcomes is the feeling on the part of some faculty members that outcomes cannot be determined for some subject areas. A very common view is that outcomes, especially in behavioral terms, may be specified for certain skill courses; but for other courses, and especially the humanities, it is impossible to specify course outcomes.

In orientating faculty to individualized learning, this is one of the critical areas to be dealt with. It is important that faculty understand that specifying outcomes for courses is by way of fostering student responsibility. It is by way of allowing the consumer to know the product before he buys it, to use a cliche. It is by way of allowing the institution, as a whole to have a well-defined understanding of what outcomes are flowing from all courses.

Every course has a learning program at Brookdale. All subjects are capable of defining outcomes. It is, as it were, to "cop out" from the problem, to side step it, if one simply says or takes the position that outcomes cannot be defined in certain subjects. If outcomes cannot be defined, then grades cannot be given and faculty who claim that outcomes cannot be defined do, in fact, give grades.

In proceeding with orientation with faculty, it is best to follow the line of thinking of asking on what basis are grades currently given out. Working from that basis, it is possible to move towards a definition of outcomes upon which grades will be given in the future.

Having dealt briefly with course outcomes, we can now move on to the subject of strategies or procedures which is the second element of a learning program.

There are several modes of learning available to the student at Brookdale. These are, in broad terms, large group instruction, small group instruction, individual study, laboratory experience, and work in the community. These are, broadly speaking, called modes of learning.

The mode of learning appropriate to the student is worked out by the student as part of his/her Student Program Plan described earlier. This is the document that each student works out with his Student Development Specialist.

In the interaction between the student and the Student Development Specialist, it may be determined that this particular person will function best with a group-support structure; or alternatively, it may be decided that this person will learn best by working individually, completely on his own; or again, alternatively, this may be the type of student who will learn best through a community involvement, work experience, co-op education, and so forth.

The student, then registered in the course, takes this conclusion to his faculty member or instructor in the course and pursues the same line of thinking, working out with his instructor how he will achieve unit and course outcomes through the procedures best suited to him as a person.

Generally speaking, faculty members make provision in courses for large group instruction, small group seminars, study of individuals in the learning carrels, laboratory experiences, and work in the community.

Naturally, not all courses have all five modes of learning available; and not all modes of learning are always available at all times. Nevertheless, the effort is made, once having defined course outcomes, to see that the five modes of learning described above are available in all courses.

It is necessary to note that the modes of learning, and these correspond to the modes of teaching or instruction, are the five I indicated before. At Brookdale, the individual working individually has a variety of ways to do this. Nevertheless, the various modes of learning are the five indicated.

This means that the system is definitely not an audio-tutorial system exclusively, nor any other exclusively. It allows a wide range of variety in the choice of strategies of learning because this is felt to be necessary to meet the needs of individual students.

It may be best to discuss briefly each of the modes of learning:

First, large group instruction is geared primarily to the presentation of material. In a larger group, material that is to be presented can be presented most efficiently. A large group is capable of listening to a lecture or seeing a film in a large space and with minimum use of faculty time. This large group is not an ideal group for discussion.

The second mode of learning, small group discussion or seminar, takes place best when groups of 15 or 20 meet with instructors in a seminar-type of environment. This mode is suited to information exchange, challenging of ideas, and discussion among group members. It is therefore in a space suited to discussion and in a group size suited to exchange of ideas.

The third mode of learning is when the individual works either at home or in a learning carrel to study course content individually. (This point will be pursued at a later time under learning resources.) This means that the student has available for him, in a variety of media, course content or course material.

The fourth mode of learning is laboratory experience in which the student has a variety of things which he can do and from which he will draw information, principles, and course content. At Brookdale, every subject area has a laboratory in which this type of learning takes place. In a traditional setting, laboratories associate most commonly with science courses. In order to meet the needs of the individual, however, Brookdale has tried to establish a laboratory in every subject area. A range here is from the Secretarial Science Laboratory, where people learn secretarial skills by doing, through the standard Science areas, to journalism laboratories, art laboratories and even the Social Sciences, where a laboratory-like experience is set up.

This laboratory-like experience is important because learning-by-doing is a fundamental principle of the Brookdale philosophy.

Very often, even in a traditional science course, the laboratory experience is important. However in traditional colleges, the lab is added on to the course lecture, the course information source. We tried to say learning-by-doing in the sense that the "doing of something" is the course of inquiry for the student, which leads him/her to find out the principles, the information, the course content associated with what he is doing. It is therefore important to have a laboratory-like-experience available in all courses.

Finally, the fifth mode of learning is work-in-the-community. Again, while this varies in its nature and content, work-in-the community in some appropriate manner is encouraged for all courses. Obviously, in some cases such as journalism, working in the community by work in a local newspaper, can be relatively easily designed. In other areas, it is more difficult. Nevertheless, an effort is made to make available learning in the community through cooperative education projects, through internships and other such kinds of learning experiences so that the student can learn by doing in the real world environment.

As we look at the five modes of learning, it is important to review the freedom and flexibility provided to the student in the selection of these modes of learning on the basis of his individual needs; and it is important to review the fact that such freedom and flexibility is only possible when there is a set of well defined course outcomes. In the absence of well-defined behavioral objectives or course outcomes, this wide range of strategies or procedures would become a hopeless maze of confusion in which there would be a great deal of uncertainty as to whether or not learning had in fact taken place. When course outcomes are well defined, learning or its absence is measurable by the achievement of course outcomes.

D. Q. *How is a professor's roll changed as compared to those who are engaged in the lock-step system*

A. In this type of environment, which is suited to the needs of the individual, we must now address ourselves to the question of the role of the faculty member. Obviously, when credit is determined or defined in terms of space and time, the role of the faculty member is quite clear. For a three-credit course which meets three hours a week in classroom Number 10 for 15 weeks, the faculty member's role is to be there at that time and deliver his talk or lecture to those who are present.

In an individualized-learning environment, the teacher's role is very different. In fact, his normal role is enhanced and is given far more significance than in a traditional learning environment.

This point is most important to emphasize in dealing with faculty members. If faculty perceive an individualized learning environment to be threatening to them in their professional role or to

down-play that role, the entire project is doomed to failure before it begins. If, on the other hand, faculty can be brought to see an enhancement of their role when they become managers of a sophisticated learning process, then faculty support will be guaranteed.

The role is indeed enhanced. This is not merely a manner of speaking. What, after all, can be more boring and what, after all, can be less challenging than delivering the same lecture to a new group of students term after term and year after year?

By contrast, working in a wide variety of modes-of-instruction and modes-of-learning, assuming the role not merely of disseminating certain kinds of information but rather of designing strategies and procedures for learning to meet the needs of a wide variety of students, is, indeed, an enhancement of the role.

The faculty member becomes a manager of the learning process, a guide to learning, a monitor of achievement, a designer of learning materials. It is important that this role be described and discussed in great detail with faculty in undertaking any project of this type. Faculty perception of the project, faculty perception of their role, are key elements to be delved into in great detail in the beginning of any such project.

Again, in dealing with faculty, it is important to emphasize that in no way does individualized learning threaten their role or diminish their importance, but rather it makes their role more necessary and more important.

Financial considerations should be dealt with frankly in dealing with faculty in this matter. Whatever the faculty association contract or agreement involves, whatever aspects may be altered as a result of an individualized project, all of this should be dealt with above-board and clearly at the outset of the project. A project again is doomed to fail if the legimate financial concerns of faculty are not addressed at the outset.

In this individualized-learning environment, one of the important things that faculty do is to assemble the learning program. It is a lengthy, difficult and, in a sense, an on-going and continuous task to spell out the course outcomes for all courses.

The breakdown of a course into course units -- with unit outcomes, unit procedures, and unit evaluation criteria -- is necessarily a beginning type project. It is not advisable to expect perfection the first time through. The first draft of a learning program may be a relatively poor document. It is, however, able to be improved, and in fact should be improved with time.

Of critical importance, therefore, in an individualized-learning environment, is the availability of a resource person to direct and help faculty members in understanding what a systems design is, how to write course outcomes, how to separate strategies from outcomes and how to assemble evaluation criteria. This person, called by a variety of titles, is commonly called an Educational Development Officer (EDO). The EDO may be called an instructional-

development person, a media specialist, or a curriculum design person. What is important is the presence and availability to the faculty of a resource person who knows how to design, in a systematic way, courses for students and to help faculty in this design. One point that is important here is that this resource person draws from the faculty the learning program or helps the faculty assemble the learning program.

The resource person is not a content expert. The faculty member should be a content expert in a field of study. The resource person is not an expert in any particular area of content. This person is, however, an expert in the system design of any course content. The resource person is able to challenge faculty members as to whether or not outcomes are, or are not, defined; whether they are clear or not clear; whether units are identified; whether they are defined and clearly separated one from the other, and so forth.

This distinction between the content expert, who is the faculty member, and the systems design expert, who is the resource person, also helps faculty members in the project. Faculty will not be threatened by the presence on campus of a systems design person. Their work, to follow this line of thinking, will be most successful if the resource person makes clear to faculty that he/she is not an expert in their field, but rather only an expert in a certain approach to laying out courses and learning programs. In other words, the resource person is a resource available to help faculty in their efforts to help students learn.

Another important role of faculty -- and related to the one we have already discussed -- is that, having designed a learning program, faculty members then may participate in the production of learning materials, which are part of the strategies or procedures element. This is the third mode of learning I spoke of before.

Note that, by contrast to the audio-tutorial method, we are only now dealing with the development of learning materials. None of the other modes of learning, that is large groups, seminar discussion groups, laboratory experiences, or work in the community necessarily involves the availability of learning materials. We use "learning materials" here in the sense of those elements of content or course information available to the student for learning, and especially available for him to learn on his own, individually.

Every course even in a traditional context has at least one element of such material available, which we call the textbook. This, after all, already contains course content, course information, and, even in a traditional setting serves as an accompaning source of learning that goes along with the lecture or the discussion mode.

It is best to associate other learning materials with the textbook or a variety of books because it makes clear from the start that we are dealing not with something unusual or unheard of but rather moving from a single type of material, the book (the printed word) out into other types of materials; namely, making the same kinds

of things available in visual forms through that which is developed in photography (film, slides, motion pictures). It means moving into another medium, possibly that of audio, making the same kinds of information and content available on audio-tapes. It means moving into another medium; namely, that of television, making the same kinds of content available either on closed circuit television or on television cassette.

In other words, all these media are simply the carrying out into a variety of other methods, or ways, that which is initially already contained even in traditional environments. In an individualized-learning environment, the more media available, the more there is variety in the availability of mediated kinds of learning and the more the environment is suited to the individual. This is based upon the fact, already identified by research, that just as some students learn best in a lecture presentation, others learn best through discussion; others learn best working in the community; and others learn best in a laboratory on their own. So, also, some people study best through the printed word. Some study best through visual portrayal of ideas. Others hear or listen better than they see or read, while some people do better with a combination of both, found in film or television.

Within this mode of learning, a variety of media is a further step in the direction of meeting the needs of the individual, moving out from the lock-step system where all learn in the same way.

This, in turn, leads me to discuss the Instructional Development Laboratory (IDL), as it is called at Brookdale. The Instructional Development Laboratory (IDL), or whatever other term is used for the same place and function, has the role of helping faculty members develop learning materials. As I said before, the Educational Development Officer, or curriculum design person, helps faculty design the learning program. The learning program itself contains no materials or course content or course information. The same person may, however, help faculty with course content or course information and put it into a variety of media. In the way this is done, though, specialists in each of the media will be needed in order to work with faculty members to help express their course content, their course information, in the various media.

The IDL, therefore, may start out as a relatively small operation. There is almost no limit to the extent to which it may grow depending upon student needs, faculty use, and the committment of the institution to a variety of learning materials. Typically, it has one or more artists who are capable of translating course information, course content, into visual format. Typically it has a photographer or more than one, capable of expressing visually (through photography) the course content or course materials. Photographed images are used either as a film loop, 8 or 16 millimeter film, slides, or as part of a slide-tape presentation.

Also, the IDL has a person who is an expert in the audio-field. This person translates into audi-format course content or course information.

Finally, the IDL has a person who is able to do the same in the television media.

The IDL therefore, has a series of persons in the various media capable of working with faculty members and, of course, with the corresponding equipment or facilities to make learning material available in these media.

Throughout this process that I have been describing; namely, the effort to individualize learning, it possibly is becomming clear that no individual person is capable of working in this environment by himself. This leads me to discuss the team concept which is used at Brookdale.

Within the learning centers spoken of earlier -- which are groupings of career programs related to each other and in which there are related general-education courses -- teaching faculty work together in teams. This is based upon the belief that a team of persons can design together a better learning program for each course than any single person and that a team of persons can design learning materials for each course more effectively than any single person. It is also based upon the fact that, in an individualized learning environment, one team member may be more expert at designing learning materials, another may be more expert at lecturing or presenting, and another may be more expert at monitoring student work in the community. The team enables the strengths of each person to be maximized while also enabling the weaknesses of any single person to be overcome through the strengths of others.

Broadening out the team concept, at Brookdale, Student Development Specialists are assigned to the Institutes. By the same token, the Library Faculty (who are called Media Specialists) are also assigned to the institutes. These two groups of faculty (I mentioned that these groups have faculty status and are on faculty contract) work with the teaching faculty in the Institutes and the Learning Centers and form a team.

The student is, therefore, dealing with faculty who help with the Student-Program Plan and assist in a counseling capacity, faculty who directly instruct him and also those members of the faculty who are expert in the development of materials and the search for learning materials and the location of appropriate materials (these are the Media Specialists). These categories of the faculty work together as a well-rounded team so that the student has his needs met by a variety of professionals, each competent in his own specialty and all working together toward one common goal, student learning and growth.

Obviously, if these groups of faculty are to function together effectively as a team, it is necessary to look at the administrative structure and be sure that the unit heads for these three groups are also bound together in some type of coordinated staff or administrative arrangement so that the unifying principle is guaranteed and that there is no separation of groups whereby the student would lose through a disassociation of one element from another.

In other words, if Student Development Specialists, media specialists and teaching faculty are to work together as a team within the Institute, it is necessary that the Dean of the Institute, the Dean of Students, and the Director of the Learning Resource Center work together as a team in some structure that fosters team or staff-work together.

Moving from the team concept, I would like to discuss, at least briefly, differentiated staffing because this too is a critically important element of individualized learning.

Differentiated staffing means that, instead of a single type of staff, there is a variety of persons all coordinated and working together to meet the needs of the total program. At Brookdale, in addition to the team of teaching faculty, media specialists, and Student Development Specialists, there is also a differentiated staffing pattern in which each faculty team has in it, or associated with it, clerical-support persons and para-professionals or learning assistants.

The clerical support persons are necessary in an individualized-learning environment because, comparable to the staff of the Instructional Development Laboratory, the clerical-support persons do the material things for faculty that enable them to have learning materials ready and available for students. This is largely a matter of typing and filing learning programs, course materials, and the like so that these will be ready and available for students. Without clerical support, it would be impossible for faculty members to have learning programs or learning materials ready.

The para-professional is a higher type of person in terms of educational background, and has a role more closely associated with the actual instructional process. Basically, the learning laboratory is the environment for the student to learn by doing. The para-professional or Learning Assistant is the person in charge of the learning laboratory. He/she is the person who sees to the supplies and equipment of the laboratories, who sees that these are available and functioning, who helps the students with his hands-on learning experiences.

We are all familiar with the laboratory assistant in the sciences. The role of the Learning Assistant is comparable to that, but moves beyond it to include a well-defined tutorial function. The Learning Assistant helps the students learn by keeping the laboratory open, by seeing that it is functioning, and helping the student to learn in it. He/she is directed in this activity by the members of the faculty team with whom and under whose direction he/she is working.

At Brookdale, these para-professionals or Learning Assistants are hired in a range of salary that can be broken down at least into two main categories. Those who have the A.A. Degree, or equivalent help the students in a more material kind of activity, like setting up equipment, keeping records of grades, distributing materials, and so forth.

The second group has the Bachelor's Degree or equivalent; and these are assigned more of a tutorial role in working with students.

Here, again it is important that faculty members perceive differentiated staffing as a method of enhancing their role rather than as a way of making them unnecessary. Differentiated staffing at Brookdale means that the College has a higher student-faculty ratio than many other colleges. The student-faculty ratio is 28 to 1. Nevertheless, it also means that the presence of clerical support persons in the team and para-professionals in the team leaves the faculty free to do those things consistant with the role I previously described, and which makes them genuine managers of learning, designers of learning programs, and learning materials.

Faculty do not have to type their own materials nor do they have to monitor the laboratories all day. These and other tasks are done by clerical help and by the para-professionals. The faculty are free, therefore, to do those things most consistent with the truly professional role that is theirs.

Differentiated staffing is also necessary in an individualized-learning environment to free up the time constraint I indicated previously. The learning assistants are on duty all day and evening and on Saturdays to keep the learning laboratories open for learning at all times. This kind of arrangement could not be carried out through faculty with the restricted time schedule usually associated with their contracts; nor could faculty design appropriate materials and plan appropriate learning programs, if at the same time they had the responsibility of monitoring and keeping open the learning laboratories.

The differentiated staffing pattern means that appropriate people carry out this variety of functions, each doing that for which he/she is trained and educated and most competent.

As the final point about faculty, I would like to deal with the monitoring of student progress. Within the traditional environment, monitoring the progress of students is essentially a simple concept since all students are present in the same space at the same time. In an individualized system, students are working in a variety of spaces and working at their own pace. This becomes a very complicated process in which the monitoring of student progress takes on critical importance. The Learning Assistants or para-professionals help the instructional faculty in this process by keeping track of where students are.

Essentially the grade records or grade books kept by the team indicate for each student when he completes Unit One and moves into Unit Two, completes Unit Two and moves into Unit Three and so forth. In this manner, the faculty team knows exactly where each student is as he moves through the learning program.

Over and above this, there is a regular three-week check. At the conclusion of every three weeks, faculty check the progress

of all their students. Those who are making insufficient progress are categorized as such or indicated to be such. A form, which has been designed for this purpose, is filled out by the faculty member and sent to the Admissions Office with a copy to the Student Development Specialist of the student. The Student Development Specialist tries to contact the student or makes an effort to see him/her to identify the problem.

In the Admissions Office, a letter is triggered through data processing, that is through the computer center; and this letter is mailed out to the student. It advises that in the judgement of the faculty member, insufficient progress is being made. The student should, therefore, discuss this matter with the faculty member or the Student Development Specialist and become more active and make more progress in the course.

Three weeks later, if the student has not changed the pattern of participation, he/she may be dropped from the course by the faculty member, following basically the same process. A form is signed by the faculty member, sent to the Admissions Office with a copy to the Student Development Specialist. This refers only to those students who are not making sufficient progress in the sense that they are not actively participating in one or other of the modes of learning approved by their Student Development Specialist and faculty teams.

In no way is a student who needs more time treated in this fashion. Those who need more time work this out and take as long as they need to learn. Those, however, who are not active and are not making progress because of inactivity, are treated in the fashion I described.

For students other than those who are inactive, namely, those identified as having personal problems, as needing developmental skills in reading or writing or so forth, there is a different type of form which the faculty members in the team send to the Student Development Specialist, who pursues the matter with the student.

In this manner, the monitoring process takes place every three weeks. There is a thorough check on all students and appropriate action taken. By the end of any term or period of instruction, all students have had the opportunity to learn and to proceed at a pace meaningful to them; and, at the same time, faculty have been provided with the tools in terms of forms and procedures to track the progress of those for whom they are responsible.

V. LEARNING RESOURCE CENTER

Introductory Remarks

Much has already been said about the Learning Resource Center, the Media Specialists, and the Instructional Development Laboratory. It is clear that an individualized-learning approach requires a Learning Resource Center (LRC) that is capable of the following tasks: it must have well-defined procedures for the distribution of and retrieval of learning materials; and it must make such learning materials, both print and non-print, readily available for student use. This is essential in an individualized-learning program.

As previously indicated, another function of the learning resource center must be the development of learning materials through staff, equipment, and facilities suited to the goals of the institution, including at least a printing or copy center for learning materials.

One critically important area of the LRC at Brookdale is the Test Center that has been spoken of previously in regard to entrance testing. At this point I would like to discuss it briefly as to its function in course testing.

Faculty teams who wish to do so (and none of them are forced to do so) may put tests in the Test Center to which students may go to take tests at their own pace and whenever they are ready to do so. The Test Center is monitored by four clerical persons and is in the charge of the

Director of Testing Services. The tests are computerized and checked-out through System Seven as are other learning materials. The student goes to the Center, checks out the appropriate test, takes it in the Center, is monitored there by clerical personnel and, upon completion of the test, turns it in.

The test is either machine scored, if it is capable of being such, or is scored by the appropriate para-professional or learning assistant who comes each day or every few hours to gather the team's tests and to score them.

In this manner, the Test Center serves for individualized learning because it is another aspect of enabling students to move ahead by being tested unit-by-unit as they proceed through a course until finally they achieve the course outcomes.

A. Q. *What is the system for checking out and returning learning modules from the library?*

A. At Brookdale, a computerized check-out system is used, called "System Seven," for the quick checking-out and checking-in of learning materials.

B. Q. *Do you have study carrels equipped to handle AVA equipment?*

A. Study carrels are dispursed throughout the facility. These are generally equipped with AV equipment and are either wet or dry carrels.

C. Q. *How do the LRC personnel know that a student is authorized to check-out a certain learning module?*

A. Since students at Brookdale received their Learning Programs from the instructional faculty, the LRC personnel do not need to be concerned about particular learning units. They do have to distribute and retrieve all learning materials in the sense of the team used previously.

D. Q. *Are special personnel required for the LRC and the module production lab?*

A. Faculty or media specialists must be on hand to help students learn through appropriate media, and they must be readily available for this.

Special staff are also required in the production laboratory or the Instructional Development Laboratory.

VI. MISCELLANEOUS

A. Q. *If a student is to perform the activities comprising a learning module away from the campus, how are the hardware requirements monitored?*

A. Hardware, in a variety of forms, may be checked out by all students possessing an ID card, along with software, at the distribution desks of the LRC. This means that students may check-out tape recorders, film loop projectors, and other types of hardware.

Naturally, how much of such hardware is available depends upon funds budgeted for this purchase. Generally speaking, tape recorders and slide projectors are very much available; however, there is a difference of degree as one moves down to the more sophisticated kinds of equipment. Video-tape recorders are not available for check-out at all.

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. Every course has a pre-test and a post-test. The pre-test is used to identify the level of skills of the entering student; and, of course, the post-test is to determine the completion of learning objectives.

Each unit within each course also has a pre-test and a post-test. Upon entering a course, the students determine at what level they begin and they are free to skip those units where they have demonstrated that they possess the competencies of those units, and move ahead.

If, on the other hand, through the entrance testing, it is found that they have difficiencies in reading, writing, or mathematical skills that are necessary to have at the College, then as part of their student-Program Plan spoken of earlier, they are counseled to take the developmental courses available in those areas.

C. Q. *How are the educationally disadvantaged, minority students, and "fast" students provided for in your system?*

A. Time restraints are absent in the system since the fast-moving students may "test out" of courses and on Continuous-Progress

Registration, move into other courses. Slower students, on the other hand, may request Deferred-Credit status and take longer to complete their learning objectives.

D. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. I will answer this question later.

E. Q. *Do you require your producers of learning modules to demonstrate competence in their area before employing them in your system?*

A. A difference must be made here between faculty producers of learning materials and the professional staff in the Instructional Development Laboratory. The professional staff, which consists of one professional person in each of the media plus a back-up person or two, are trained producers or trained professionals in their own right, artists, photographers, sound personnel, and next year, a television person. Each of these is a trained professional in his own field.

Faculty who work with these persons do not have competence other than in their own field of teaching. Occasionally, they will know something about media, but this is not ordinarily the case, nor is it required.

The faculty member, working with a media specialist who serves as an advisor, works in the instructional development laboratory with the professionals in the media fields. The team, therefore, is made up of a faculty person (who has competency in his subject area), a media specialist (who serves as an advisor and who knows how to translate learning materials into mediated form), and the professional in each of the media. This team of three or more persons is the best method we have found to develop learning materials.

F. Q. *Do you have an educational technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

There must be in-service training for all those engaged in a systems-designed program. As indicated, the instructional-development person or curriculum-designer works with all faculty in order to help them design their learning programs. This is the document, referred to before, which contains course objectives, the breakdown of the course into units, the separation of objectives from strategies or procedures, and the identification of evaluation criteria.

This person at Brookdale meets with one team of faculty per week all year, and this process is on-going so that there is a review of all learning programs at least once a year. The interaction between this person and the faculty team improves the quality of the learning programs.

In regard to the various media, such as audio-art, photography, television, there also must be workshops to help faculty understand how these can be used effectively in an instructional process.

Generally speaking, we have encouraged faculty to produce learning materials. We have, therefore, placed very little restraint upon this process, taking the position that genuine encouragement is the best approach. Setting up too many constraints, too many requirements, causes the faculty member to become discouraged, rather than encouraged.

As part of this process, faculty members are reimbursed or paid to develop curriculum. The faculty contract calls for a certain number of days in a term. These days may be spent either in direct teaching or in curriculum development. Curriculum development is the term used for that process whereby the learning programs for courses are designed and for that the process whereby learning materials are put in mediated form and assembled.

If a faculty member teaches two long terms, for example, the contract may leave 20 days in which learning materials may be developed. The Deans have a large degree of flexibility in assigning faculty members to develop curriculum as an alternative to direct teaching. In addition, there is something in the budget each year to hire faculty members specifically for curriculum development at times of the year when they are not under contract.

Since curriculum development is a time-consuming, difficult process, it is necessary to have a well-defined financial arrangement whereby faculty will be paid in one fashion or another to carry out this process.

VII. EXTRA COLLEGE ASSISTANCE

A. Q. *To what extent are off-the-shelf learning modules, commercially produced, used in this system?*

A. All course learning programs at Brookdale are designed by the faculty in collaboration with the Director or Curriculum Design as indicated earlier. Learning materials on the other hand are either produced locally or purchased. The decision whether to produce locally or to purchase is contingent upon a series of factors including relative cost, relative quality, time, skills available, and so forth.

One of the critical decision-making processes in the Learning Resource Center is the process whereby this decision is arrived at. Teaching faculty work with media specialists assigned to their own teams as indicated previously. In order to identify appropriate learning materials needed for their courses, the media specialists in charge of purchases and the media specialists in charge of development of materials work together to work out what is the best decision in individual cases, to purchase or to produce locally.

It is obviously not cost-effective to avoid this type of decision process because it is quite possible to purchase at high price what might be locally produced more cheaply, or visa versa. The same may be said of quality. Competent developmental persons and competent librarians in the Media Center or Learning Resource Center are needed to make this decision.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

A. Brookdale used a series of outside consultants early in its history. Recently, the Director of Curriculum Design worked with faculty in regard to learning programs. The staff of the Instructional Development Laboratory works with faculty for the development of learning materials. Far fewer outside consultants are used at this time.

VIII. PLANNING YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year; i.e., production of learning packages, developing of systems, etc.*

A. Since Brookdale uses the systems design in all courses, the following planning stages are used:

First, any new course first gets course approval. Course approval comes through a series of stages including origination of the course through student interest, faculty interest, outside advisory body's interest, or some combination of these.

The proposed course is then discussed at the institute advisory committee made up of faculty and students of the institute and the institute Dean. Upon recommendation to have such a course, the recommendation is sent to the Director of Curriculum Design, who works in the Vice-President's office. His function is to study student need, student interest, and the place of the course in the total curriculum of the College.

Parenthetically, it may be said that the curriculum should be developed systematically, and this is one of the most important needs that colleges have. If the course is approved by the Vice-President after recommendation from this office, then the next stage consists in faculty designing the learning program for the course. Course approval generally takes place in the Fall. The development of the learning program takes place over the next few months. A learning program must be completed by August 10 of the following year if the course is to be offered in September.

In the meantime, it may be placed in the master schedule of courses since this is produced very early in the year. But, the course is cancelled in August if a learning program has not been completed.

After the completion of the learning program, learning materials appropriate to the course are developed by the faculty team and the staff of the Instructional Development Laboratory.

While every course must have a learning program, the amount or degree of learning materials is not a fixed figure. Every course must have no less than two modes of learning as indicated in the discussion previously. This, however, includes learning materials such as books, or other printed materials.

After the course is offered once, there is an improvement of the learning program through review with the Director of Curriculum Design. The gradual addition of other modes of learning and the gradual addition of appropriate learning materials follows. The sequence, therefore, is course approval, development of the learning program, and development of learning materials.

IX. IMPLEMENTATION YEAR

A. Q. *Please list the major activities and events that must be accomplished during the implementation year; i.e., field testing, evaluation, admissions, etc.*

A. During the first time that the course is taught, the Director of Curriculum Design has his meeting with the team teaching the course, for review of the learning program. This consists in validation of objectives on the basis of experience, validation of learning materials on the basis of student use and student learning, and validation of the testing criteria. As a result of this meeting, changes will be introduced in the learning program for the next use of it.

X. BOOKSTORE

A. Q. *What involvement does the bookstore have in the selling of software to students?*

A. The bookstore sells books to students in a general fashion customary to colleges. Brookdale's position, however, has been to distribute, free of charge, all learning programs for all courses to students. In addition, our position has been thus far to distribute free of charge all learning materials developed by faculty. Naturally, to do this, the print shop needs a fairly good size budget. If these materials are of rather significant size, let us say over a hundred pages, then one of two alternatives is followed. A series of sets are produced and given to the Learning Resource Center for distribution and retrieval; and, in this case, the materials are not given free of charge to students. Or, alternatively, the material is placed in the bookstore and is sold at cost.

B. Q. *Does the creator of the module receive royalties?*

A. Since materials are sold at cost, if sold at all, there is no question of the receiving of royalties. This, however, raises another point; namely, that of copyright or royalty for faculty who develop learning materials. In my opinion, the faculty contract that the association has with the board of trustees should specify this matter and detail it. Brookdale's contract with the faculty does this. I believe that in order to promote harmonious dealings between faculty and administration in an individualized-learning environment, this matter must be dealt with to the mutual satisfaction of those involved. It is, in my opinion, clearly a contractual matter and one which should be binding on all parties involved.

XI. EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel, and other components?*

A. Each year the faculty team teaching particular courses does its own evaluation of the learning program. At the same time, the Director of Curriculum Design does his evaluation of the learning program. In the meeting held between the Director of Curriculum Design and the faculty team, these two evaluations are discussed in detail. Variations of opinion are discussed and a consensus is arrived at on how the learning program can be improved for the mutual benefit of all involved, most especially the students.

We have found by experience that it is best to separate the evaluation of personnel from the evaluation of learning programs and learning materials. Certainly, in a system such as the one at Brookdale, the faculty members' design of materials and design of learning programs is a legimate element of his evaluation as a faculty member. Nevertheless, this role which is largely confided to the Learning Center Chairman, is best separated from the role of the Director of Curriculum Design in meeting with faculty to improve their learning programs and their learning materials. Our experience has been such that when these roles are complicated or confused or not well distinguished, faculty members tend to see the Director of Curriculum Design as a threatening type of person, and this in turn prohibits effective collaboration to improve the learning programs.

XII. COSTS - BUDGET

A. Q. *How does the cost-effectiveness ratio of your system compare with the cost-effectiveness ratio of lock-step systems?*

A. The individualized-learning system used at Brookdale is comparable in total cost to that of other community colleges. There is no increase of cost; nor is there a decrease, in our opinion. Rather, there is a somewhat different use of resources.

The different use of resources consists in having a higher student-faculty ratio than might be done otherwise. This is based upon the fact that faculty should be able to concentrate on their highly professional role when provided with learning assistants or para-professionals and clerical support staff in a differentiated staffing pattern. In addition, more emphasis is placed upon instructional development and learning resources than in a traditional type of budget. The Student Development specialists have a different type of role than that which is traditionally associated with counselors. In other words, the total system costs about the same as a traditional approach. However, resources are allocated in a different manner.

Every new course at Brookdale has a learning program. We estimate approximately three times the number of hours that a course would be taught as a rough approximation of the amount of time needed to design the basic learning program for the course. In other words, for a three-hour course, we anticipate that the faculty member or team will spend approximately 135 hours developing the basic learning program.

As indicated above, this does not involve any production of materials, but rather the learning program; that is, objectives, outline of strategies and procedures, and evaluation criteria. We, therefore, see that every new course has this type of time allocation either as part of faculty contract or on an extra salary basis in order to have the course ready for the following term.

In dealing with the modes of learning earlier, I have tried to make clear that the five modes of learning are used. In every new course, at least two or more of them will be available.

Since Brookdale's system is not audio-tutorial, some of the other elements of this question are less relevant to us. Brookdale does not envision an audio-tutorial possibility for every course. Faculty teams are free in regards to the amount of learning materials available for completely independent study.

In general, the cost of this approach is off-set by less cost in other areas. For example, if a faculty member in a traditional setting is responsible to teach 120 students, then a faculty member in this program might be responsible for 150 students, wich a difference in income allocated to learning materials, tutors, test center materials, and so forth.

One of the immediate problems that one encounters in developing materials for individualized learning is the fact that a general faculty tendancy exists to want to develop one's own materials for one's own courses. Since faculty members traditionally chose textbooks for use and find no problem in this, it is advisable to seek a way to help them move from that point of view into the selection of other purchased media and materials for students use. If these can be purchased, a large expense will be avoided that would go to a developmental laboratory with mose sophisticated kinds of equipment.

The establishing of this kind of laboratory and especially one with sophisticated kinds of equipment can be a very expensive matter. Materials for individualized learning have been in fact developed around the country and many of these are well done and excellent for student use. The first intent should be to identify such materials for purchase and to seek to use them. It is usually cheaper to purchase such materials than it is to set up the kind of laboratory in which they can be developed. If these are professionally developed with involvement of a professional staff and then purchased, they will generally be of a better quality than can be developed locally.

Very often, developing materials locally at colleges has not really taken full advantage of the proper use of the media involved. Very often what is distributed in printed form is read onto the tape, and not it is available in audio form. In fact, if we are to individualize learning, the kind of student who learns best by listening also needs material suited to listening. And this is not merely a matter of reading onto a tape that which could be read.

The same thing is true of all the other media. It is not enough simply to draw pictures of what one may be using in printed form. Conveying learning materials visually requires a particular talent or skill most difficult to find. We are all familiar with the problems of television when it first came into education. Many teachers simply stood in front of the television camera and gave their usual lecture. This vidio-tape was shown to students, instead of seeing the real person giving the lecture. There is no significant learning advantage to watching a face on a television screen giving a lecture instead of listening to the real person.

These are just a few examples of how media have not been used in their proper form. By no means is this said to discourage faculty from developing materials, nor is it said to discourage the concept of an instructional development laboratory. It is simply

to point out the caution that should be taken in the use of media. It is a highly professional kind of activity in which real professionals must be found. Where possible, learning materials should be purchased rather than developed locally, relying upon the fact that commercially developed materials draw upon the quality of expertise not generally available locally.

If one does move into the local development of learning materials, I would advise that this be kept rather simple. Audio tape is a very simple type of thing to use. Developing slides is a very simple thing. The more complex forms of development are difficult to handle, require rather expensive equipment, and have not been proven yet to be educationally more productive than the more simple forms of media.

The learning-material dissemination process ought also to be kept very simple. Many students will already have their own tape recorders, or a series of tape recorders can be supplied for checkout through the LRC. The same thing is true of slide projectors. The more simple the dissemination equipment, the more easy it will be for students to get it and use it and learn through it.

In order to make learning materials available, the really fundamental operation is that of the print shop, which will have the capability to make large quantities of printed material available to students involved in the program at relatively low cost. A competent person in charge of this operation is an absolute necessity.

Above all, before beginning the process of developing any learning materials, it is, in my opinion, most necessary that the learning program first be developed carefully. This is the program which identifies the outcomes, the competencies and the skills to be developed in the course and the units through which the student will be proceeding. This is the document which separates outcomes from the list of various procedures, strategies, and activities available. This is the document which indicates the evaluation criteria.

This process of systems design, with the well defined use of objectives, is of critical importance, as indicated earlier, because it frees the student to use a variety of procedures in order to achieve outcomes. In the absense of this process, the development of learning materials will simply become an involvement in audio-tutorial study.

While certainly there is nothing wrong with audio-tutorial study by itself, it may not be a significant improvement over group structures. If, on the other hand, the audio-tutorial approach is one of a variety of strategies which the students are free to use within the context of being evaluated on the basis of outcomes, then other possible alternatives to learning may be made readily available.

For example, as important as is the developing of materials for audio-tutorial study, a very important element in such a program

For example, a most important element in an individualized program is the design of learning activities for the student in the community. This is not a matter of developing materials for study, but rather a matter of finding, identifying, contacting possible work experiences through which student learning can take place. This project includes internships, cooperative education, on-the-job training and other such kinds of activities.

A person responsible for this will be most valuable in terms of individualizing learning and breaking away from lock-step instruction. His role will be of equal importance to the role involved in the design of learning materials for audio-tutorial use.

By way of conclusion, I would like to deal with the closing of the loop, as it is called in systems design, which means that feedback is fed into the system to improve it as it proceeds.

The basic source of such feedback is student evaluation of what is happening. Formal procedures should be developed to get student responses to the system, student input as to how it is working, and student involvement in its evaluation.

The result of this evaluation process is then fed back to the beginning of the systems design where the results are used to update or improve the individualized package. And, thus, we are back to the beginning, ready to start again. It's really on-going.

CAMDEN COUNTY COLLEGE
Blackwood, New Jersey

The Non-Lock-Step Educational System

Interview of

DR. ROBERT HURST

On Individualized Instruction

February 17 -- 19, 1975

Mario J. Giordano, Director

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FORWARD

On July 1, 1974, Camden County College was awarded a Grant by the Fund for the Improvement of Post-Secondary Education, Department of H.E.W., for the purpose of developing an individualized instruction system for implementation across Camden County College, which will allow students to proceed at their own rate through courses of study and eventually entire degree programs. The plan includes the use of a variety of self-instructional materials as well as the training of faculty members in the appropriate roles for the new system.

In working toward these goals, a number of experts in the field of individualized instruction are being invited to Camden County College campus to advise Professor Mario Giordano, its Director, on planning and implementing individualized instruction systems.

The following is a report on the dialogue between Professor Giordano and Dr. Robert N. Hurst, who visited the College in the role of a consultant on February 17, 1975.

Dr. Robert Hurst is a colleague of Dr. Sam Postlethwait of Purdue University who directed Dr. Hurst to come, in his place, as a consultant for the Audio-Tutorial method of instruction. Audio-Tutorial, originated by Dr. Postelthwait, began as a method by which students who had missed lectures could make them up by listening to taped versions of the lectures. This method has since evolved into a more sophisticated instructional system, and has been used nationally as the prototype for individualizing instruction in the sciences.

The Audio-Tutorial program, as conducted at Purdue, is a peer-proctor managed instructional systems designed mainly within the confines of prescriptive and achievement management instruction modes. Additionally, time constraints are somewhat imposed in that students must complete the course within a prescribed period of time. Self-pacing takes place within that constraint.

How This Report Will Be Utilized

The outcomes of this Grant, funded by H.E.W., will result in a final report that will synthesize the findings of at least eight to ten consultants. The synthesis will take the form of a consensus on how individualized instruction can be installed in an on-going college that is currently using conventional modes of instruction.

The data compiled in this consultant's report will be fragmented into its component parts and utilized in the preparation of the final report, that will be presented to H.E.W.

INTRODUCTORY REMARKS

My name is Robert M. Hurst. I am an Assistant Professor of Biology at Purdue University, where since 1969 I've been involved in an Audio-Tutorial course in Zoology. In '69 we started with about 300 students; we're up to about 850 students each semester. So, though I'm not speaking of a college or university whose entire mission is aimed towards individualized instruction, I am involved in a fairly large course where this is our desire, and we've been able to do some things over the past five or six years to further the cause of individualized instruction. I will answer as many of your questions as I can. Some of them will not pertain, really, to the kinds of programs you are looking for since I'm involved in a course, a single course, that is fairly traditional and wide open at a conservative institution. So a lot of my answers are not going to be very exciting as far as Purdue goes; but at the same time, I'll try and put in a little information on what we do specifically in the course, which side-steps some of the institutional situations.

Part I

ADMISSIONS

A. Q. *How does a student apply for admissions to your school?*

A. Purdue University is a land grant college for the State of Indiana. As such, it's certainly not an open university. Its admission policies are fairly liberal, and a student can initiate an admission form to the University through many different directions -- either by writing directly to the University or by picking up an admissions form from his high school counselor, or whatever. It's a fairly simple form that a student can fill out in just a few minutes. I left a copy with you.

There's a section on there for the high school guidance counselor to fill out. That's the only tricky part. The student has to go through the process of seeing that his high school counselor gets a copy of this.

B. Q. *What are the admissions requirements?*

They vary from school to school. Typically, all schools have some requirement about the student standing in his high school; also, a requirement concerning the number of years of math, science, English, and foreign language that he may have had. There's a handy little wheel that Purdue has produced which a student can use to determine whether he or she is qualified to enter a given school at Purdue. I've left a wheel with you, along with the application form.

C. Q. *What are the record-keeping forms and procedures used in the admission sub-system?*

A. The admissions form sent in by the student is copied onto a computer card or a series of cards. These are put into the computer. All the admissions procedures, counseling, and registration as such are taken care of by the computer at Purdue.

D. Q. *When the student leaves the admission sub-system, what proof does he carry with him that he has been admitted to your school?*

A. Within a few weeks -- sometimes in a matter of weeks -- after the student has sent in his application form, a letter of admission is sent to him. Purdue is very efficient in this procedure. Since they are a state university and the door is open to virtually all residents of the state, as long as they have fulfilled the very minimal requirements that are set down for admissions they will be admitted. The student gets a letter to this effect.

Part II

REGISTRATION

A. Q. *Where does the student get advice about scheduling, curriculum and courses?*

A. On his admission form, the student is requested to give a preference for one of the schools. That school is given the information that this particular student has been admitted for study. In about June of each year, the student receives a questionnaire from the school asking him to indicate some dates on which he could come to the campus (for a so-called "Lay On Campus") with his parents. The student is then assigned a day that he's to be on campus and meet with counselors from that particular school. It's then that scheduling, curriculum and courses are discussed. Actually, the student is registered for his fall semester during that day on campus.

B. Q. *How does the Registrar know that the student has been authorized to enter classes for which he is registering?*

A. This is all, of course, on computer. The registrar would catch this at the time the Course Request Sheet was submitted.

C. Q. *What are the forms and the record-keeping procedures involved in the registration sub-system?*

A. There is one, primarily; and I've left you a copy of that. It is a worksheet, a mark-sense worksheet, where the student has his student data entered. Course requests are made by blacking out particular blocks of the Course Request Sheet. At the time that the worksheet goes through the computer, if the student has not been admitted, he will not be accepted.

His Social Security Number is used in all cases as the identifying number for that particular student. If a student were not registered or not admitted, the Course Request Sheet would not be accepted.

The Course Request Sheet is filled out at the time that the student meets with his counselors on his Day on Campus. Now, the counselors are full-time counselors from each school. After the student arrives, he is assigned to a faculty advisor as his counselor; but the counseling for the first semester of enrollment is taken care of by the professional, full-time counselors from each school during that summer day on campus.

D. Q. *What proof does the student have, upon leaving the registration sub-system, that he has been: (1) admitted to school; and (2) gone through the registration system?*

A. Shortly after the student has had his Day-On-Campus and filled out his Course Request Sheet, it is sent to the computer where a program is arranged for that student in those particular courses. And, typically, about the end of July or the middle of August, the student gets a form back which is a single sheet along with other information, obviously; but the single sheet tells him that his pro-ram has been prepared. This particular sheet is an invoice of his fees. It tells him what he has to pay. It is not the program. It just simply says, "Your program has been run; it's in the computer. When you pay your fees, we'll send you your program.

E. Q. *Can a student register at anytime during the year?*

A. Yes, especially a transfer student, but most of Purdue's students start in the fall semester and go through this "Day On Campus" bit in the summer. There are students who, obviously, start second semester. For them, these full-time counselors that I mentioned before will meet with them sometime during the first semester. We get them started virtually in the same procedure except there aren't hords of freshmen students running around campus for a period of two or three weeks, as there are in the summer when they all come in for "Day

On Campus." Most of the admissions are at that time. Now, a student could walk in at anytime and, at least, fill out the admissions form. But, if he filled it out sometime in January, let's say, they expect him to start the next fall. He still would have to go through counseling or scheduling during the summer "Day On Campus" the next July.

F. Q. *Is there a minimum and maximum number of courses for which a student may register?*

A. Only theoretically. A student can register for as small a course load as he cares to; but, again, unless we are talking about the courses in the extension program, students are not typically part-time students. They are full-time students. Therefore, they are in our regular degree program. We don't have a lot of credit enrollments of three or four or five or six semester credit hours. Most of our students are full-time, unless, of course, they're graduate students. Obviously there's no maximum number of courses. We do suggest that the student not enroll in any more than 18 hours.

I understand that there is a student enrolled this semester in 42 semester credit hours. Apparently, he is surviving. But that's a rare student. Most students would be counseled by a hundred different people not to involve himself with that kind of load. But, it is possible.

Part III

BURSAR

A. Q. *How does the Bursar know that the student who is attempting to pay for courses has been fully admitted and registered?*

A. As I pointed out under "Registration," a student will be sent the last sheet of a four-or-five page form which I have left with you. This indicates that he has been admitted to the program and that his program has been run. There's an area on that sheet that's been blocked out. That area is where, in other copies, his program would actually be printed. Now, he can send in that sheet along with his check. Upon receipt, the Bursar sends the student another sheet out of that four-or-five-page form which has his program or his credit on it, to show in which classes the student is enrolled in and when he's supposed to be where.

B. Q. *What forms are involved?*

A. This single, four-or-five-page form I've mentioned before is used both by the Registrar to program the student and also by the Bursar to indicate that the student is indeed eligible to pay the fees.

C. Q. *What is the tuition amount charged for each course or module?*

A. As I pointed out earlier, most students at Purdue are full-time students. They will typically pay the full tuition charged which, since Purdue is a state-supported institution, is relatively low -- $375 per semester for anything from eight credit hours to as many as the student can talk his counselor into. Students with seven or fewer credit hours in any given semester pay $27 per semester credit hour.

We have students enroll in our course, and perhaps 15% do not complete the course. Well, one nice feature of Purdue's system is the fact that he or she can return, complete any incompleted course, and get credit for it at any time. In other words, there is a number of "incompletes" at Purdue (which every institution should have) that remains incomplete virtually forever. At Purdue the book reads that this incomplete changes to a grade of "W" or Withdrawn after a full semester has gone by and the grade has not been made up. But, there is a way to side-step this because a grade can be changed at anytime as long as the Dean of the school in which the student is registered signs the form. It can be changed ten or twenty years later, as far as that goes, as long as the Dean of the school in which the student was registered at the time is willing to sign. This is a kind of rubber stamp operation. So, one nice feature about Purdue is that a student pays for a course one time and one time only. He does not have to pay a second time if he didn't complete the course the first time through.

D. Q. *What form (or proof) does the student have that he has paid for a specific module?*

A. At Purdue, we are not dealing with modules to any great extent. Well, to any extent. We deal with courses, and his fee statement -- this is the pink sheet of this four-page form I've referred to -- that is returned to the student after the fees are paid, on which his program is printed. That's his proof that he has paid for that particular course or is eligible to enter that course.

Part IV

FACULTY

A. Q. *When the student is reporting to class or to a mentor, how does he prove he belongs there? What form is involved?*

A. Again, the student's fee statement (that little pink form) has his program printed on it and is his ticket for entering the course. If the instructor cares to see student tickets, then the student must produce it.

B. Q. *What sort of orientation does the mentor give the entering student?*

A. Again, I'm sure you're talking about a tutor situation where an individual is working with a tutor, with a mentor, on a more-or-less one-to-one basis. Since we really don't have that at Purdue, I would say that the answer to your question would be that the mentors or the course instructors, obviously, give the same orientation to all of their students at the first or second meeting.

C. Q. *What is the procedure for the issuance of learning modules, the performance of the activities involved in the module, the mastery test, the completion of modules and the issuance of the next sequential module?*

A. This is where I have to deviate from the questions that you ask about Purdue University. I have to start talking specifically of our own courses because this is what I'm sure you are interested in, anyway.

Our course is set up as a series of mini-courses. We prefer the term "mini-course" over module. I guess Sam and I, in this respect, are probably unique to most of the individuals involved in individualized

instruction. The term "module" is quite acceptable but, to us, it can mean anything. It can mean a component of a house, or a component of anything in our society. But a mini-course is more defining. It fits our mold a little more than the term "module." When one speaks of a learning module, he could be speaking of many, many different things; but we feel that when he speaks of a mini-course, he's speaking precisely of an instructional package which is just like a traditional course but in a very tiny package. So, in our program, the learning materials are packaged in these tiny, little instructional units we call mini-courses.

The courses are variable credit-hour courses in the sense that a student could be enrolled in one of our courses for one, two, three, four, or even five semester credit hours. The number of credit hours in which the student is enrolled determines the number of mini-courses for which the student is responsible.

Our courses are service courses -- which primarily take care of students from two general areas, the pre-pharmacy students and the agricultural students. We have two primary packages of mini-courses for those two groups of people. Which mini-course taken is determined by the counselors and the faculty members in those two schools.

The pre-pharmacy student is typically enrolled in the courses for three-semester-credit hours, each semester. (108 for three-semester-credit hours, 109 for three-semester-credit hours.) All of the students in the General Ag, or in the whole School of Agriculture are typically enrolled in four semester-credit hours in each course.

We are designed at this point in time with the mini-course packages in such a way that we could offer tenths-of-a-credit-hour. We would do so if the Registrar at Purdue were a little more amenable to our idea of what a flexible program ought to look like.

So we have two primary packages -- three-credit-hour packages for the pre-pharmacy students; four-credit-hour packages for the Agriculture students. This latter group bothers us considerably because, in the School of Agriculture, we find students enrolled in Horticulture, Agricultural Mechanics, General Ag, Vocational Ag, Ag Engineering, and Animal Sciences for all the pre-veterinary medicine students. We

run quite a wide spectrum in the School of Agriculture. The General Ag student at Purdue is probably one of the weakest. The pre-vet student, on the other end, is one of the stronger students at Purdue. And we are not fully convinced that the Horticulture student ought to have as much Zoology, perhaps, as a student in Animal Science; or that the student in Ag Engineering or Ag Mechanics needs as much Biology as the student in Horticulture or the pre-vet. But, the school is conservative enough that, at this point in time, they have not used the flexibility we have programmed into 108 and 109, to look at the whole Introductory Biology sequence and decide that, perhaps, Horticulture students need just six hours of Biology, a few hours less of Zoology, or Animal Biology, and maybe the Ag Mechanic needs only four or five hours -- just so he knows what Biology is all about. Perhaps, the Animal Science people need nine or ten hours of Biology and a little more Zoology than they are getting at the present time. We are setting up to do that. But, they are not ready to make these kinds of changes because it would mean some fairly dramatic changes in their thinking and in their book-keeping procedures. They are also concerned that their counselors may not be able to stay on top of it, which is a stupid idea. Nevertheless, it's preventative from taking the full advantage of the whole concept of the mini-courses--writing individual programs. Where we do get a chance to individualize programs within the courses is with the student who is enrolled in one, two, three, or four credit hours outside the School of Science and outside of the School of Agriculture. We do get a considerable number of these people. The percentage is less than 10%, actually; but that still is a fairly considerable number of students. These people we handle individually.

We do give those kinds of students individualized help where we try and ascertain in an interview with them what their background has been in Biology, what their interests are, why they decided to enroll in the course, what they hope to get out of it, and the number of semester credit hours they enrolled for. At that time, we set up a program for them, giving them as much option as possible in the choice of learning modules, if you will, or mini-courses that they choose to complete their credit hour requirements.

I should point out that even the traditional student enrolled in 108 or 109 has a great deal of option when compared with traditional courses, a great deal of option in the kinds of mini-courses they take to satisfy the credit hour requirements for which they are enrolled. Up to about a fourth of all their mini-course packages is optional but chosen out of the mini-course variety.

What we did in 1969 was to look at the content of Biology 108 and 109 and see what we have been teaching as traditional Biology and traditional Zoology over the years, in each course. Once we've put the mastery system into operation -- where we could make sure that a student did not get credit for a given mini-course until he or she had achieved some minimal level in that particular unit -- we were able then to eliminate some of the redundancy that had took place in both courses. The 108 person was teaching some of the common topics to the students in 108; and when the students went into 109 the next semester, the Zoology professor taught many of the same subjects because, obviously, the 108 person hadn't done it quite right, or some of his students told him that they didn't know about miosis, cell respiration, or other topics that are fairly common to both plants and animals. So, in 1969, we went to the mini-course package and the system of learning for mastery and eliminated the redundancy. Now, a student can get out a mini-course on cell respiration at a certain minimal level.

By eliminating the redundancy, we ended up with about a quarter more time, which is exactly what the Carnegy Commission Report, titled, "Less Time, More Options" predicted. We pre-dated that report by a year or two. We found out earlier that we could probably eliminate 1/4 of the student's curriculum just on the basis of redundancy if we would just have them achieve at some mastery level in the beginning.

So, this is what we did, and this gave us some extra time. We devised a whole series of mini-courses and optional mini-courses from which the student picks and chooses. It totals about a fourth of their curriculum during each semester enrollment in the sequence. With students who are not in the traditional three-credit hour pre-pharmacy package or traditional four-credit hour Ag School package, the options are sometimes much greater than this. In fact, for a student who comes in for a couple of semester credit hours just to see what Biology is about -- maybe an engineering student or a home-ec student who wants to know a little bit about Biology, given some guidance and counseling from myself if they are enrolled in 109 or Sam if they are enrolled in 108 -- the student picks up to 95% of

the curriculum in that special one, two, three, or four credit-hour package.

The student in the three-credit hour, four-credit hour traditional package -- three-credit hour pre-pharmacy student, four-credit hour student -- there is less option for them. They choose about 25% of their curriculum based on the fact that, out of the mini-courses that are available, certain numbers are required by their schools, as chosen by their counselors and the administrators of those particular schools.

We evolved four different categories of mini-courses. One category we evolved first was the area of the common concepts or common topics in Biology. Here we discuss and work students through mini-courses on cell respiration, mitosis, miosis, genetics, and those concepts that are common to both plants and animals.

We have another category of mini-courses that we call "Plant Mini-Courses." Here we discuss the topics that are associated primarily with the plant world, photosynthesis, cell or plant stem structure, diversity of plants and so on. We have another category called "Animals" where we discuss primarily concepts involved with the animal world. Finally, we have that fourth category, the optional one where anything is fair game, from topics that primarily pertain to the plant world or animal world to theoretical biology or areas of applied biology. It's a pretty wide-open area. Anything that's biological in nature is fair game, and we've devised some pretty far-out mini-courses in this particular area.

Each mini-course has its own printed study guide and follows a fairly similar format. On the first page or two, there's a set of objectives that tell the student precisely what he has to do when he finishes the learning package. Then, typically, we have a lot of print information, information that we'd like the student to take away with him in the form of print material. We also have some white space in there where the student is to complete some exercises or take some notes off of the audio tape.

By the way, the tape is not a lecture on tape, it is definitely a tutorial, a conversation with the student on a one-to-one basis, which is what the backbone of the Audio-Tutorial system really is.

The student, if he so chooses can take that study guide, sit himself in a carrel in the Learning Center, and go through that learning package as it

[illegible] mind the option of doing it [illegible]. We don't care *how* they got the information or whether they even listen to an audio-tape. All we care about is that, at some point in time when they are called upon, they can [illegible] the objectives and to do what it is we've told them they are supposed to do.

We get some students who can use a general textbook, along with the study guide and the objectives, and get to where they are supposed to be on their own. We have some students who get a great deal of information from their room-mates or somebody who has gone through the material. Some students come into the learning center and do the experiments and look at the demonstration materials only. Other people, of course, go through the program as it was designed. But, we really don't have any kind of monitoring of how the student studies biology, and we really don't care. All we care about is that they get to that point where they can satisfy us on a mastery test covering the information.

So far as procedure for the issuance of the learning modules, our study guides, we have several different sources of a study guide depending on where they have been printed, whether they are commercial study guides, or whatever. I'll talk about that a little later on.

We have no control over which ones the student purchases. We don't care if the student completes or attempts to complete every single mini-course that we have ever designed. It doesn't bother us in the least that the student enrolled in two or three semester credit hours may do as many as six or seven hours worth of credit. They have done this under certain circumstances, and I'll mention this later on in terms of some of the options that we've had.

We are less concerned, as a large state university, with the students taking more away from the class than he has paid to take away because our fees are not that critical to us. I'm sure there are some schools where, if a student enrolls in three semester credit hours and takes six, you lose some money that's critical; but that's not the situation with us.

About the mastery tests, we have to separate the kinds of tests we give on the basis of what we are talking about: common, animals, or plant mini-courses, or whether we are talking about that group of mini-courses we call the optionals, because they are quizzed a little more differently. With the optional mini-courses, students can work at any time. The mini-courses are available in the learning center, and they can go down to a quiz room and take the mastery test of optional mini-courses on the schedule anytime they feel like it.

We have a room in which we place the secretary and about 15 forms of 15 different quizes for each optional mini-course. Also, we have keys for each of those 15 forms. The secretary simply sits and waits for students to walk in the door and says that they would like to take the quiz on optional number 1 or optional #10, or whatever it is. She gives him a form with that quiz. The student sits down and marks the answers he thinks are right on an IBM card, brings the card up to the secretary, who has a set of keys for each optional mini-course. So, she slaps the key over the answers, and tells the student whether he or she has achieved mastery.

Mastery in all these cases, typically, is minus one. If there are 15 questions on the quiz, we expect the student to get 14 of them right. If they don't they obviously have to repeat. We tell them to do some studying, talk with one of the tutors in the course or one of the graduate students and try it again.

We've found very early in our career, and I'm sure you've heard this from other consultants, that you have to put some kinds of restrictions on the students. Regardless of how flexible you want to be and how flexible you design your program to be, it has to have some kinds of restrictions just to protect the students from themselves, not to protect your system because for 12 years, the student has been told where to be, and when to be, and how long to stay in some educational setting. Maybe this is different in other schools where the students are a little more mature,perhaps, than the typical student we get, but we've found that we just simply couldn't say to the student on the first day of the semester, "O.K., at the end of the semester this is where you're to be. Now, go." We've found that he needed some guidelines, restrictions, and a little bit of structuring just so he could live with it.

One of the things that we've found that we couldn't tell students is, "Well, we're going to have a learning-for-mastery system, and you take a quiz. If you don't do it the first time, you study and re-take it. If you don't do it that time, you study and re-take it. If you don't do it that time, you take it again." We found that didn't work. What happens is that the student did, indeed, take it once, and not make it, and they'd take it a second time and not make it, and a third or fourth maybe, perhaps a fifth or sixth, and still wasn't getting there. In fact, if we looked at the scores for those students, we may find that on a given mini-course, a student may have answered 13 out of 15 questions right the first time, which is just one question off of mastery. Maybe the second time they took the test, they got another 13 or 12. Maybe the third time, they got a 10 or 11. After about half a dozen times, they may have been getting 4 or 5, somewhere around "chance." So, you pull that student in and say, "You know, you used to know 13, and now you only know 5 worth. What's happening?" And the student would tell us, "Well, that's what I do know. When I try that test again, I think I remember seeing a question on another form. I say, "Yea, I've seen that before, and I think I answered 'A' before, and that was not right. I'll try 'B'." They were guessing because there were no restrictions.

After they would do this a half a dozen times, they'd give up on that course. They weren't studying in-between because there was no club, or there was nothing that would cause them to study. Well, during the first semester, when we discovered this, we changed our system. We put another step in there that we found most helpful -- check on the student to see whether he or she now is ready to take the quiz a second time.

I'm sure that some of your consultants have talked of the use of students in the course, or former students. I know that Gil Sherman talked about proctors in terms of PSI. The kinds of student I'm going to talk about is really not a proctor as such. What we did was plug a student in between the first and the second attempt. We didn't start out doing this. We began plugging graduate TAs in the spring semester of 1970, after our first disasterous semester of mastery learning.

We started telling our students that, "Before you take that quiz a second time, you go to a graduate student, a TA, in the Learning Center. There's always a TA there. He or she will give you an oral quiz . If you're ready to take the mastery quiz a second time, you will be given a little ticket. Come down and give it to the secretary in the quiz room, and she will let you take the quiz again.

This made a lot of sense to us. The graduate students would indeed issue tickets. Instead of having about 15% go down the tube the second time, we'd have about 5%. So we inserted the TA again before the third attempt. This cut it way down. Only about 3% of all our students now fail a quiz the third time.

We virtually cut it all out when we simply told the student, "You get three chances. If you don't do it in three chances, then what you ought to do is to wait until the end of the semester. We'll have a week then, and you can try any modules or mini-courses that you haven't reached mastery on. You can try them again at that time."

But, after the first semester, we ran into a problem because that's about when the state monies were being cut down. Federal monies for support of students were also being cut down, and we didn't have as many graduate students working as TAs. The enrollment was going up and the number of TAs was going down.

Our graduate students were pretty much tied up, helping students who had gone down the tube on a mini-course. They didn't have the time to help the student who was in the Learning Center going through the material for the first time. That kind of student was being punished and that was not right. He was spending all the time, every bit of time, with the student who was having trouble, which is good. But that's not the only aspect of instruction. So, we had to look for some other source of help.

We came up with the idea of using students who had completed the mini-course that the student was having trouble with. That student checked the readiness of the student having trouble in an oral quiz about the objectives. We pay these students, not in money, but in points much like people in PSI pay students extra credit for a course. If they serve as a proctor, we pay our people bonus points for a slightly higher grade. The number they could earn is not enough to bounce them from a "C" to a "B" or a "B" to an "A," but it could throw the balance in their favor.

We only let them work ten hours a semester, for a total of 20 points. We pay them 2 points an hour. The 20 points would kick them over if they were on the border-line between one grade and another, but it would make about 40% of the point difference between a "B" and an "A." They would still have to do other things to get that "A" grade.

So we plug these people in to check students that have taken mastery tests for the second time. Of course we had to have some kind of criterion for excellence, some kind of criterion to judge whether the student could be a tutor. So, we decided that we would simply tell him, "You cannot serve in this capacity unless the students you tutor show progress." In other words, their students must get through the quiz the second time.

We looked at the record that our TAs and graduate students had and found that they had about a 75% pass rate. We thought we'd be a little tougher on our students who are currently enrolled; so we told them that they were going to have to have their students get through at the 80% level. In other words, if any single student has fewer than 80% of his charges fail to get through the quiz the second time, we'd simply not let them tutor anymore.

Well, the results were slightly less than astounding. Whereas our graduate TAs had a 75% rate, the lowest semester we ever had afterwards was about 92%. One semester, while we were using this system, we had about 98% of all the students who tried the quiz the second time get through.

When we used student tutors and, at the same time, graduate TAs, a certain percentage of the students were tutored and checked for their readiness by the graduate TAs. It's interesting that the TAs never raised their level above the 80% mark. But one semester, we had 98% of the students tutored or checked by a student tutor get through the quiz the next time.

The premise we work on now is that students should not have any more than three cracks at a quiz in a semester. We can easily hold to this with the optional mini-courses because, if students fail to reach mastery on a given optional mini-course in three tries, we simply tell him to forget that optional and take another one.

All we care about is that he ends up at the end of the semester, or whatever he chooses to get his grade, with the right number of units completed. We don't particularly care that he may have attempted twice that many. In fact, we realize that if he's exposed to twice as much information as he masters, he is obviously not too bad. Maybe he's not as good a student, intellectually, as those who try 17 units of optional and get all 17 units the first or second time. The student who is exposed to 34 units and can only finally end up with 17 units completed, certainly has got a good exposure to Biology, and that's what we're trying to do, after all.

So, that's how we administer the optional mini-course mastery quizes and tests. As far as the mastery tests on the other three categories, the required mini-courses for the traditional student in 108 and 109, are not required. Some have a different set of requirements for the three credit hour, as well as for the four.

But the animal, plant, and common courses are quizzed in a slightly different way. The student is scheduled each week into a one-half-hour oral quiz. In the half-hour oral quiz, they are in a group of about 10 students. They are scheduled and meet with the same group of ten students all semester long. Each week, there are certain mini-courses that are being discussed in an oral quiz setting. The format is very rigid. It's one of the few rigid things in the program -- and the fact that the student has to appear whether he or she is ready or not to take the oral quiz. Typically, they are ready to attempt it anyway, but we have to know our students. When we have 850 students in each course, the only way for us to know each student is to counsel that student, help that student with any trouble and get him in a small group where we can get to know him.

So, Sam takes some of these, just as I do in my course.

We have a lot of graduate students also, but every kid is scheduled into a one-half-hour oral quiz session with nine other students. Somebody gets to know that student in that course and can give them some guidance and counsel.

In an oral quiz, students sit around a table on which there are items from the mini-courses. There are items that refer to, or are out of the instructional materials for the mini-courses under discussion that week. There are plants, or animals, or parts of experimental set-ups, or parts of demonstrations that have been out there, or perhaps some cards with some key words on them.

The students do not know which objective they are going to be asked to do. The items are randomly picked up and handed to a student. The student has to do particular things with it. He has to identify the item, relate it to an objective as a second part of his little oral quiz, and thirdly, complete the objective.

If the objective is to identify five structures of the buckeyed twig, the instructor hands the student a buckeyed twig. The student has to say, "This is a buckeyed twig. It relates to objective #3 of P5 which is to identify five structures of a buckeyed twig. At this point, we have the terminal bud , and here you can see a leaf." He goes ahead and teaches, in essence, that objective to the other students. Of course, this causes him to learn the material in a different way because we really learn when we have to teach it. In essence, he has to learn to teach each week those mini-courses for which he is responsible.

That's half of his test. The student is graded on this on a fairly loose scale with not very many options. So, it doesn't become too subjective.

There are only three grades that can be given -- four if you count the zero given to the student who didn't get the work done and simply says, "I didn't do it, so I'm just here because I'm supposed to be here. I'll have to try and make it up." That kind of student is given a zero. The other three grades are simply: 6, 8, and 10. The student who does a minimal job, obviously gets a 6; a student who does a minimal job but comments on the performance of others, aids things, or makes zero corrections can get an 8. The student who does a good job on his own objective gets an 8 straight out. The student who does a good job on his own objectives plus makes comments on other people's objectives can get up to a 10. So, we take out as much subjectivity as possible so that hopefully most of the TAs are grading at about the same level. And a point or two in either direction, typically, won't hurt the student when all of the points that are possible for the course are taken into consideration.

The student also takes a written mastery test over each objective, taken about every three to four weeks. It's set up in a large assembly where the student comes in and answers questions on whatever objective or mini-courses he or she is responsible for. The student is given a number and given an option number also. All this is coded on his IBM card on which he takes the test. So the computer knows what this particular student is responsible for.

If the student is responsible for -- for example, on the first quiz for animal mini-courses -- one and two and the quiz is over three or four, the computer simply ignores those questions that are on A3 or A4, and only pays attention to those questions on A1 and A2. These are marked on the quizes. A student knows that these questions go with A1 and this set goes with A2. So we keep track of each student and his option with a computer program.

The day after the quizes are given, there is a print-out disseminated which identifies the student by a code number he's been given that no one else has, and that will list A1 and tell him

[illegible] he has correctly answered. Maybe A1 had [illegible] [illegible] every time 12. It will give him a 12/13 score which tells him that he got 12 out of 13. There will be a little asterisk there which tells him he reached mastery; so he's through with that particular one.

For all of those on which he failed to reach mastery, he has to go in that week or the next week and retake his test until he reaches mastery.

Until this last year, students took a separate written quiz in that same room with the secretary on all of the animal, plant, and common that he was responsible for, just as he did for the optionals. But the test room can't take that kind of crunch, or we'd go right back to it. Space is short for us. Even though we have some 700 students in the few courses, Purdue does not really count numbers when it assigns a space. It simply looks at the courses. Two courses gets this much space, period. We can't get another room or another secretary to run a mastery system as it should be. If we had our druthers, we would have those mastery tests given the same way we give the optional mastery tests. But, the room simply can't take the crunch.

Interestingly enough, however -- and this might be a significant point -- the students are happier taking the optional or the common, plant, and animal mini-course quizzes every third or fourth week rather than having quizzes on those mini-courses every week. They accept the optionals, and they know why they have to be quizzed individually. Every student takes a different set of optionals, and no one comes out with exactly the same mini-course package, as far as the optionals are concerned. But, they appreciate taking those other quizzes less often and repeating only those on which they fail to reach mastery. We've had more satisfaction with the quizzing format under this routine that we have now than any other we've had in the previous four years.

I saw in Bob Tott's comments, "... students get very tired of all the testing ..." I'm sure that's true, and they seem to appreciate the tests that come up less often.

There's another little thing we found out about instructional packages that might be of importance to you. We've found that students prefer smaller packages. Now, when Sam got into the audio-tutorial business in 1961, he designed his courses with about four hours of work in the Learning Center for a student each week. He had a week's unit, and it might cover one or two or three different ideas that we cover in two or three different mini-courses, now. When we started in 1969 with the mini-course idea, we felt that we could take any topic or any concept up to about four hours of work in the Learning Center which might involve the student with 30 or 40 or 50 or maybe as much as 80 minutes of tape time plus other activities. It would take them perhaps four hours to complete it. But, the interesting thing is that when we talked about that -- the instructional package being a mini-course at the beginning and

end -- it changed his attitude completely, apparently, about what was acceptable as a mini-course and what was not.

I remember the first semester, 1969, I designed a mini-course I called, "Excretion." There's not a lot you can do in the laboratory on excretion. So, there was a lot of tape time, about 80 minutes. The student would spend about three hours in the Learning Center that week with that 80 minute tape. There wasn't a lot of demonstration or experimental materials to work with, and they hated it. And, of course, since we asked for their comments, they told us it was terribly long and boring and so on. It was too long, too much.

So, the very next semester, I took that 80 minute tape, that mini-course on excretion, and I divided it into two logical concepts: the idea of excretion in animals in general and the idea of kidney function. I thought of some more things that could be done in the laboratory and more demonstration material. So, I remade the tapes and had two mini-courses, now, instead of the one that I had last semester. I increased the tape time from about 80 minutes to about 90 minutes, and I increased the total time in the lab from about three hours to about three and a half.

Now, the student had both mini-courses to do in that week, instead of a single mini-course that they had the semester before. It turned out all right. It was acceptable to them. The interesting thing is that they may come in and sit down at a carrel, do that mini-course, get right up and walk over to another carrel that housed the other mini-course, and do that one at the same time. So, they may spend another half hour in the Learning Center than they did the semester previous to this, but they didn't mind it.

Our idea was that with an 80-minute tape, you can listen to 20 minutes and leave and come back and listen to another 20 minutes, and leave and come back and listen to another 20 minutes. They did this when Sam had weekly units, but as soon as we went to the mini-course, they didn't do that. They apparently finish a mini-course once they start it. They want those small packages to give that closure, apparently, earlier.

A mini-course is completed for a student once he or she has achieved a mastery level. It's recorded on their records by the computer.

About the issuance of the next sequential module, our mini-courses are indeed sequential; but we've discovered a long time ago -- as many, many other people have, also -- that the sequential idea is probably less important than most people have previously thought in years past. In fact, we tell students, "Look, if you're having trouble with a mini-course, give it up for this semester and go on. Just forget about it. You can pick it up next semester; or perhaps, at the end of the semester, we'll have some time and let you make it up then."

But, we encourage students to keep moving through, not to get hung up on a particular mini-course.

Now, that's a little different than most of the PSI systems, where a student has to achieve on one before he can go on to the next. We haven't felt that that's in the student's best interest all the time, especially when he's close to mastery. Typically, students will be very close. It isn't as if we have given him a 14 point quiz and they can never get any more than two or three right. They typically get around 10, or 11, or 12 right on one of their attempts, but they're hung up on something. So, we'll say, "Forget that and go on. Come back at the end of the semester -- this semester or next semester." And usually when that happens, when the student gets another crack at it, he'll say, "Gee, I don't know why I couldn't get that the first time. That really was quite easy." So, as far as moving on, we do schedule mini-courses in the Learning Center each week and we ask the student to try and keep up and forget those that they can't quite get at mastery level.

As I pointed out, we have about a 10 to 18% incomplete rate in any given semester. We have fewer than 3% that drops the course, typically; so, we carry most of our students through. If we count our drops, we may get up to 21% either dropping or taking an incomplete. That's not bad at all for a course of that size. That's not bad in any introductory course in the freshman year.

D. Q. *What are the forms involved in this sub-system?*

A. I answered that when we discussed the procedure we used to keep track of what a student is doing in the course, where each student is assigned a specific

number code. The code number is a very easy way for us to find out where or why a student is. It's a five digit code. For 108, the first number is an 8; for 109, the first number is a 9. If the student is in the first oral-quiz division, his code number will be 901. If he is student #1 in that division, his code will be 90101. The next student will be 90102, and on up to ten for that division. That's the oral quiz division.

So, when we look at a number, we know precisely who the TA is for that particular student and we know how to find out who that number is. Everything he does in the course, he does under that code number. If he's taking written quizzes, there is a space on every IBM card for that code number to be entered.

We use an optical-scan reader and we've had our own cards printed for its use. The student code numbers are put on them, along with answers. The cards are made in such a way that the student can record whether he is A1 or P2 or C3, or perhaps Optional #7. He records that along with his answers, form number, and such.

The computer takes care of storing that information after the secretary has scored the optionals by hand. Of course, the card is submitted to the "reader" and put on to the program. We get a print-out every two or three weeks of each student's progress, to see that what the student has done is recorded properly.

Finally, at the end of the semester, the computer "knows" what that student is supposed to be given as a grade and prints out the grade for us in the final go-around. It's a matter, then, of simply transferring it to a grade card.

So we use a fairly sophisticated computer program that can handle as many different options as we have students. We keep track of them in this manner.

We do have a way of checking to see that the student who goes in and takes a quiz for student 90101 is indeed student 90101. We simply have the student show his passport to the secretary in the quiz room, and his name is checked against the name he's put on the card. The TA gets all of the cards. He has to see that the name matches the student's code. So, we don't have any problem having students taking tests for someone else.

E. Q. *What communication system is installed to inform other sub-systems, i.e., Registrar, computer, administration, etc., of the progress of each student through the overall system?*

A. This is more or less what I've been talking about. We have print-outs to inform me and the teacher assistants (TAs) of the progress of each student about every two or three weeks. Actually the TA can, at any time, go to the terminal. We have one terminal that we program through and change student records. Teaching assistants can go to the terminal at any time and request a student's program or student's progress report by code number and see what the student has done up to that point in time.

F. Q. *What number of weekly hours are spent with students by the average faculty member?*

A. Of course, this is an impossible question to answer. At Purdue, an instructor has responsibility for a course, typically. There are some instructors, I'm sure, who have responsibility for more than one course but certainly not in the School of Science. And we fit two different roles at Purdue. We're either research people or we're teaching people. There are very few of us in the School of Science who are there primarily to instruct. Most of us, there to do basic research, have a single graduate course that we may teach every other semester to a group of 20 or 30 students or maybe five or six. Then, there is a small group of us in biological sciences that teach very large courses; and in reality, make it possible for the other people to research. By teaching and servicing such large numbers of students, the state comes through with an allotment for "X" number of faculty members for that department. They are there because people like myself have 800 and some odd students a semester in a single course. So, we have no teaching load as such. My responsibility is the 850 students that are in 109 each semester. How I teach them Biology is entirely up to me. I can sit back and never have a contact hour with the student, or I can schedule myself for 100 contact hours. That's my responsibility. The only thing that obviously has to go is the course. If the course is in trouble, I'm not doing my job. But I have no set hour requirements. So, if I can give this in a lecture/lab situation and make a course that's acceptable to the administration, I can probably get by with eight or ten contact hours a week for myself.

When I say contact, I shouldn't say eight or ten total hours. I might lecture for four hours a week, but I would have to design the labs for the TAs to run in a course of that size for eight or ten hours a week.

I could probably get by with a course of this nature: by putting it on an individualized instruction format, -- an AT group or, if I had gone PSI and designed some of these materials, or if I'd gone with any other self-instructional system -- I would put in 40 to 80 hours a week, which is exactly what I did when I started. And nobody cared that I was putting in 80 hours a week. That was why I was hired at Purdue in 1969, to put 109 on AT. Then, I knew that it would probably take 80 hours a week, so I went down there with my eyes open. Now, of course, the materials have been developed to the point where I put in a respectable week. I guess I am now reaping the benefits of those first two or three years.

So, your question really doesn't pertain to a school like Purdue, where there's no set number of hours. If you're asking what number of weekly hours are spent by me with students now, I would say that I'm probably in contact with students for about ten to 15 hours a week. Some weeks, I am totally emersed in students. In the first two or three weeks of the semester, I probably spend 30 to 40 contact hours with students each week. But, that drops down to eight or ten later on. It averages somewhere between 12 and 16 hours a week, only two or three of those hours in formally scheduled hours. Most of it is spent in informal, unscheduled contacts in my office.

I have an open policy and students take advantage of it. I talk with a lot of students during each week.

G. Q. *What is the student-teacher load?*

A. This, too, does not pertain to me. The figure I can give you is the load that is used to assign graduate TAs to the course. We schedule about 50 students to each graduate student or to each TA. So we have a single staff member for most of these large courses; and if we're talking about a course of 500 students, we'll have a senior staff member and about ten graduate students. I have about 15 graduate students working for me. One of them is a full-time graduate instructor, responsible for preparing test items and such for the course. I have another full-time

graduate instructor who has designed the computer programming and keeps working with that aspect. He's also working on the CAI. So, in that 15 or so half-time graduate students enrolled in the course, I have some full-time people that are doing other things.

H. Q. *Are there any special pay considerations involved?*

A. The answer, of course, is no!

I. Q. *How is a professor's role changed as compared to those who are engaged in the lock-step system?*

A. I think I've probably half-way answered that when I mentioned the time factor. Obviously, a professor using the traditional lecture/laboratory approach spends far less time in actual contact with students and in preparation time for his course. Once he gets a good set of lecture notes, it's probably good for three or four years, even in Biology where things are changing.

After I developed my mini-courses, it became obvious that a mini-course is good for about two semesters at the most. Before you know it, it has to be changed.

Typically, the first version, the survival kit version, is good for one semester if you're lucky. Then it needs to be thrown out and completely redone for the next semester.

So, the role changes considerably as far as time is concerned. It also changes considerably in terms of how well the students do. I had an open door policy for students. Whenever I'm there, they can interrupt, and it doesn't really matter to whom I am speaking. Students are told that they have priority on my time. They come first and visitors or anybody talking with me come second. I will talk to them as they have questions or problems that arise. So, my role is considerably changed from the traditional instructor.

Interestingly enough -- and I'm sure that some other consultants have pointed this out -- when you use objectives and you tell students what it is that you expect them to do, they start viewing you in a different light. At least I've found this to be the case. Students stop viewing you as the "heavy"

in most cases. It's interesting that the objectives become the heavy; the objectives are the things that are standing in the way of a student's learning. When he doesn't understand the objectives, it's not you that he doesn't understand, or what you're trying to say; he doesn't understand that objective. So he's probably more willing, or at least he seems to be more willing, to come and talk to you about a bad objective or one that he didn't understand -- not a bad bit of instruction that you are responsible for. It's kind of interesting to see how this changes.

Obviously, your role changes in as far as becoming a manager of instruction instead of a dispenser -- especially if you use other sources of instructional materials other than just yourself. Hopefully, anybody involved in individualized instruction will do this. They'll take advantage of anything anybody has done elsewhere and try to adapt this to their setting so they don't have to reinvent the wheel. That's the biggest problem in individualized instruction. Everybody is setting out on his own to do something in terms of individualized instruction, and is going about making the same mistakes that someone else has. If they only knew of what some of these other people have done, they would be willing to adapt it. Here again, I noticed as I glanced through Bob Toft's report that he discovered with his faculty something that I've certainly discovered in working with various workshop groups across the country and having people into our own Purdue for the summer for a couple of workshops. People are very prone to look at other individuals' work and learning packages and decide that they are not any good. No one is quite as good as they are. No one really has his fingers on what the student wants to know, or what the student ought to know. So nobody elses' materials are really any good, and they have to build their own.

Bob Toft also pointed out that many of them, after trying to build their own, re-evaluate their position. They come back to looking at someone elses' work and attempting then to revise or to adapt it. They try to get something out of what someone else has done. I think this is a dramatic change in the role of a professor in a system like this. He has to admit to himself that he's not the only Biologist or the only individual who can teach accounting to a student, that other people have done some things that perhaps are worth looking at. He can adapt it, and he might save some time. So, he becomes an adapter,

a thief, if you will, in many cases of taking programs that have already been prepared by someone else and adapting them to his own setting, to his own students. He doesn't become necessarily the dispenser of all wisdom.

If he steals from somebody else, or borrows, or adapts, the other person's name ought to be on the material. Several years ago, I gave up on the notion that I was the only person who could produce good mini-courses. Of course, I felt that way for a long time, but I found that other people could indeed do a pretty significant job. At the same time, I could use some of these materials with far less investment of my own time. It was a whole bunch easier to take something they have done and revise it or make it suit my needs than to start from scratch and build a program like this myself. So, if you look at the mini-courses I use, you'll find they are from all different sources. You'll find all different kinds of names on the front cover of those mini-course study guides; and they've come from all different areas, as far as the University population is concerned. I have a few that have been prepared by other senior staff members, by some of my former graduate students and by present graduate students. I have a couple that have been prepared by some of my former students at the time that they were in the course. They would come to me and say, "You know, you've done a terrible job." One I can think of was about a unit on birth control. I had women come to me and say, "You know, you did a terrible job on birth control. You sound just like a typical male. Your facts were alright, but you just didn't approach it from the right standpoint."

I guess they expected me to sit and argue with them; but, instead, I said, "Well, why don't you design a birth control mini-course for me, as it should be designed, from the woman's standpoint. You develop the mini-course and I'll use it." Well, what they produced I felt was quite inferior to my own, obviously,; but I've been using it for about 2 1/2 years now, and it's adequate. It does the job. I've had no one complain about it not being enlightening or interesting or even informative. So, I've continued to use it; although I felt, and I still feel, that it's less exciting, not stimulating, and less interesting. It's also less varied. It has more talk, less do, and more straight note-taking and less interaction than the unit I designed. But, it seems to get the job done. The students don't seem to mind it.

So, sometimes we have to change our role, standing down a little bit and letting someone else do something for us that maybe they can do better. At least they may do a more exceptable job as far as the students are concerned.

Part V

LEARNING RESOURCE CENTER

A. Q. *What is the system for checking out and returning learning modules from the library?*

A. In our situation, we do not use the library. We have used the audio-visual center in the times past. When the course was first started, the audio-visual center was the place to go. This was back in 1961, when one wanted to take the course in the 18 method, when it was still offered both ways.

For our own learning resource centers, we have two rooms, one with 59 carrels, the other with 49 carrels. In any given week, there may be as many as a dozen different mini-courses set up in each learning center. Based on the number of students required to take a given mini-course, the length of that particular mini-course, and how long it takes a typical student to finish it, there will be a different number of carrels assigned to that particular mini-course.

So, we may find in one of the learning centers that mini-course C2 may have 15 carrels assigned to it because most students have to do it. But, it's a fairly short mini-course. We may assign 15 carrels to mini-course C4, which is not to be completed by as many students but a longer mini-course. And then we may have only a couple for C1 because most of the students did that one last week and we just have to have a couple of hold-over booths for the students who didn't get it done. And so it goes on up the line.

We may have, as I say, as many as a dozen mini-courses scheduled in that learning center for that week. The number depends entirely on the number of students that have to complete the mini-course and the amount of time that it takes the average student to get through.

We have a tag board at the front of each of these learning centers where are listed the mini-courses that are available and the booths in which they can be found. A little tag is placed over each hook that represents each carrel. The mini-course listed on it is available in that carrel.

A student signs into a carrel by simply taking another blank tag and dropping it over the front of that one, indicating that someone is using that booth. When he leaves, he takes the tag off and frees that carrel for the next student.

So we have a set number of carrels for every mini-course each week. The possibility arises that the carrel may actually be filled, or all of the carrels for a given mini-course may be filled when a student comes in. The student may find that he has to come back at another time. In other words, although students are not scheduled into the learning center, at any given time, they find out after the first few weeks of the semester that they have to somehow scatter themselves or schedule themselves out over the hours that are available. They can't all come at one time. 800 students won't fit into the available booths in either learning center. They want to come Tuesday at two in the afternoon because that's a desirable time.

So, they find out that they have to scatter themselves over the available hours each week.

The learning centers are open 74 hours a week, from 7:30 in the morning until 10:30 at night, Monday through Thursday. We close at 5:30 on Friday, and then we open for four hours on Saturday.

B. Q. *Do you have study carrels equipped to handle AVA equipment?*

A. Yes we do. An audio-tutorial mini-course is a multi-media kind of thing. Any given one of them is liable to involve the student with several different kinds of projected materials. A given mini-course may involve the student with some slides, so we need a carrousel. It may involve the student with some 8mm films, so he may need a loop projector, or a reel-to-reel 8mm projector. It may involve the student with some posters, so there might be some posters in the booth. It may involve him with some laboratory experiments, some small experimental

materials that might be placed in the booth with him. It might even involve him with larger demonstration materials. If that's the case, then the student has to get up and go look at the demonstration table, when we tell him to do so, to check those materials.

So, yes, the carrels are equipped to handle whatever equipment is small enough to fit into the carrel. Other times, he needs to observe a small section of a vidio-tape. We may have to get him out of the booth and send him up to a demonstration table because you can't afford to put a TV monitor and a media playback unit in each booth. If you can afford to, you may not have the space to, and you probably won't. So, in many cases, we have to get students up to look at a segment at a central table. We do use some video-equipment for certain mini-courses. Some mini-courses are entirely video, with no audio-tape to it -- all video cassette. Obviously, when it's that kind of mini-course, the carrel is set up a little differently.

C. Q. *Is a record of time spent at carrels kept by the Learning Resource Center?*

A. From time to time, probably about every third or fourth semester, we do institute a program for checking on the time a student spends in the learning center, but not that we care to know how many hours a student spends in the learning center -- we don't care if he spends 20 minutes in there a week in all for a four-credit hour enrollment. That wouldn't ever bother us because it's up to us to design the instructional packages, to write the objectives in such a way, that if a kid knows that information he indeed has earned four semester credit hours. It doesn't concern us that he came in with some of that information. If he did, fine.

We give him a chance to test out at the beginning of the semester of any or all of the mini-courses and simply get credit for the course that way. Those that he checks out of, he doesn't have to do. So, we don't care about the minimum amount of time that a student may spend in the learning resource center. The primary reason for checking periodically is to find out whether we're requiring <u>too</u> much time or if our courses are <u>too</u> demanding for the average student.

for a great number of our agricultural students, it's a four-credit-hour course. We want to know that he isn't spending 20 hours a week in the learning center for four credit hours. If he's going to get four semester credit hours for the course, he should be spending about five or six hours a week in actual contact with course materials. We compare this course with others on campus. We monitor periodically how many hours a student spends in the learning center to see that we're coming out about right. So far, we've been on the button.

We also, from time to time, take a check on the number of booths that are being occupied at any given time and the percentage of usage of the study carrels so we can better decide which hours are used generally. We usually post these for the students to see. So, we can tell students to shy away from particular times because there are more students in the learning center at that time and that they are liable not to get into a booth for the first few weeks. On that basis, we design the hours for the learning center.

We used to remain open Friday evening, but we found that that was not a very worthwhile time because there were so few students who would come in on a Friday evening or even a Saturday afternoon. We know now for example, that we could close down the learning centers from 5:30 to 7:30 p.m. and not lose too many students. But it seems to be a bit of a nuisance to close down in the middle of the day; so we remain open for those two hours when the learning center population typically falls off rather drastically. The students are taking a break for dinner and a little leisure and such before they come back and hit the Biology learning center again.

We could cut down also at 9:30, for example, and not disturb too many students, but some people come in as late as 8:30 to start a mini-course. If we closed at 9:30, they would probably get cut off before they had a chance to complete it.

Students generally design their time fairly wisely and in terms of a given mini-course. They know if they have a one unit mini-course that it's going to take them about an hour and a half to two hours to do. So, they typically won't come in and start a one unit mini-course at 9:30 at night. They'll get there by 8:30, and maybe at 10:30, they are the only ones in there. But, they're finishing up then. So, again, we just look at convenience for the student and stay within a respectable number of hours for the university.

D. Q. *How do the LRC personnel know that a student is authorized to check out a certain learning module?*

A. In our situation of course, it's how does he know that a student is authorized to check into a carrel and study. The answer is he doesn't. And, really we don't care because the student is not going to get credit on his transcript until he is enrolled in the course. It just doesn't bother us at all if somebody walks in off the street to learn some Biology in our learning center without being enrolled. I know that would be suicide for some small schools. They couldn't handle it. We just don't notice that kind of person. In fact, we encourage this kind of activity.

For example, every semester we have students coming in from West Lafayette High School for advanced Biology. They come over and take a percentage or a share of that course in our learning center. We don't even notice their presence that much. It just doesn't bother us. We know that we get a lot of people listening to certain mini-courses, those that are more popular, like birth control or veneral disease. We have friends of students who are enrolled who put these kids on to this -- that you can go see or hear this neat mini-course.

So we get a lot of those students who wander in off the streets and listen to the material. It doesn't bother us. So we really don't pay any attention to whether students are supposed to be there or not. In fact, this probably is where we can do the greatest service for education.

Every semester we have about 30 or 40 horticulture students enrolled in a 300 level course who have forgotten some of their Biology from 108. The professor in charge of that 300 course asks these students to go back and review two or three different mini-courses that they had in 108 because they've forgotten what he thinks they should know. He gives them a little pre-test and, based on that, asks them to go back over and check out those mini-courses again. Of course, that doesn't bother us at all. That's what we're here for. So, they dump a few students on us each semester. But, again, we have enough of a cushion in space that we really don't notice this increase.

It hasn't always been this way because 59 booths plus 49 booths are not enough to serve 850 students, even when each is open 74 hours a week. They are

barely enough -- figuring 98% efficiency. But, it works because some students don't need that much time in the learning center and because we have another program going, that I'll mention in just a little bit, that takes some of the pressure off of the learning centers.

E. Q. *Are special personnel required for the LRC and the module production lab?*

A. No, the special personnel that we use in the learning center are the graduate TAs and they are probably the poorest individual that we could have in a learning center. They do an adequate job, but they do a much poorer job than a second kind of person we have there. We have some students who are undergraduates, working for money as do the graduate student. They are much better personnel to have in the learning center because they were through the material last semester or the semester before that. They are closer to the information. They know what problems students have, and they are about 10 times the teaching assistants that our graduate TAs are. They do a much, much, much better job.

We have another kind of individual in the learning center that's perhaps a cut better than the paid undergraduate -- the unpaid undergradute. There are two or three each semester who work for credit. They enroll in an open-number course -- we have series of open number courses, and I think every institution should have some. So they handle students who want to help in a teaching situations, who have the abilities and a lot to offer. You just have to have some format or some program that they can get into, to get credit for, in what they want to do.

At Purdue, every department, typically, has a series of open course numbers, and I'm sure Camden County does also. We have Biology 195, which is called Special Assignments; 295, which is special assignments at the sophomore level; and 395, which is special assignments at the junior level, and so on. That course can be anything that the individual, who uses the number, cares to make it.

Each faculty member is given a designator code within the department. For example, mine is Designator Code 30 for the Department of Biological Sciences. And on the enrollment form, when the student enrolls

in his courses, there are a couple of necessary blocks there. So it serves for all courses adequately. The student can look in Biology 195. There is a column there that is for variable credit hours. He has to use this for 108 and 109 because they are variable-credit courses.

But, if he, for example, wants to enroll in a Bio 195 and do some teaching for us -- he was in 109 last semester, and he wants to teach in 109 -- I'll let him enroll in one or two or three hours of Bio 195. He fills that in, and he puts down the variable credit hours as one, two, or three, whatever we've agreed upon. Then, in another series of columns lower on that sheet, he blocks out Designator Code 30. On the back of that sheet, in one corner, there is a grid where you can enter the title of a course of this nature or an open numbered course. He would bring that particular enrollment sheet over to me since I've had him in a special assignment course, and I would fill in the title on the back and perhaps put "Teaching" and "Audio-Tutorial Biology" down as a title for this Bio 195 course. I might put down "Tutor in Biology 109" or whatever I wanted to put on that particular course as a title.

Then the student goes ahead and works for me on some basis that we've agreed upon -- the hours that he spends in the learning center each week. We may agree upon some special requirement to get an "A" -- like developing a mini-course, do something that betters the course or enhances the course somehow, perhaps design some art work for me, or whatever.

At the end of the semester, when the grade report comes out, Bio 195 is listed with the title I've given it. He gets credit for that course on his records.

We have two, three, or four students like this each semester, but we've never solicited this kind of individual until last semester. Until that time, if a student came in and said, "You know, I'd really like to work in the course. Could I do something?" -- we've always made this option available to them, and several have taken advantage of it.

Last semester, for the first time, we advertised for tutors -- not to work in the learning center as much as to work in a little room we were given to tutor students in oral quiz situations, to practice oral quizzing with these students prior to their scheduled quiz, upstaires, in the oral quiz rooms. The response to our advertisement was rather astounding.

We didn't put it up until about the last week of the semester, and it meant that every student who decided to do it would have to go through the drop and add, which is not the easiest thing to do. We still had about 20 students enroll in both courses in 190. We had them enroll in 295 so we could keep them straight from some of our 195 people working in the learning center as undergraduate TAs. We had them enroll in 295 and called this "tutoring" in Bio 108 or Bio 109.

They are also making special contributions to the course. Different people are doing different things. One individual has a so-called "Plant-of-the-Week" program. Each week he puts out a different plant with a common scientific name -- primarily house plants. You can purchase these with instructions on how to take care of them, and such.

Someone else has an "Animal-of-the-Week" program. They try to bring in different kinds of animals, talk a little bit about their range and their habitat, their life habits, and such.

One student is building a quiz board. We have various other students doing different kinds of things as their special contribution to the course, along with their tutoring activities. Of course, these are very excellent contributions to the whole staff situation in the sense that these students can help other students a lot more and a lot better than, typically, I can because they are less likely to come to me than to them. I am less likely to understand what their problem is than another student. Benjamin Bloom points this out in his article, "Learning for Mastery." I am firmly convinced of this fact after working with students, with student tutors and with student assistants. I firmly think it's a good foundation upon which to train personnel to help in a learning resource center.

Part VI

MISCELLANEOUS

A. Q. *If a student is to perform the activities comprising a learning module away from the campus, how are the hardware requirements monitored?*

A. We do have a tape check-out service. In a course that is used fairly extensively, we make cassette tapes available to the student for all of the mini-courses. We have not really worried about the hardware components because most students have a tape recorder available to them -- either their own, their roommate's, or someone in the family. Somewhere, they can come up with a tape recorder. We have had in the past about 15 tape recorders that we could check out, tiny little Hatachi play-back units that cost us about $15 each. The students could check it out along with the tape if they didn't have the player. They didn't get very much use. We'd check out, for example, 700 to 1500 tapes for a given week. In the same week, we may only check out one or two of the play-backs because the students had their own or could get to one.

We have also checked out, in the past, some mini-course kits which would have most of the demonstration materials that were small enough to package and any of the slides that may accompany this particular mini-course. We could not check out, obviously, 8mm film loops and projectors, but we could check out those kits that would contain some slides and other materials. We can do this by actually taking pictures of some of these materials that the student would normally see "in the flesh" in the learning center. We could also accomplish this by lending the student a PMC pocket projector for 2/2 slides. That worked very nicely. We lost none of these, and none were broken. Some bulbs were knocked loose and broken, occasionally, but we've had pretty good luck with checking out some of the mini-course kits.

We haven't checked out kits for two or three years, though, because we do not have a more extensive program for allowing students to do their studying places other than in the learning center. This will fit very nicely with your college-at-home program, or your institution programs, or any kind of an extension service program.

We have been involved for the last year in a program in some of the residents halls, and we've had phenominal success with these programs. We have actually gone into about seven of the major resident halls of Purdue and set up a learning center. Virtually the same materials have been made available to the students in those dorms that we make available to students in the learning centers, and it's been fairly economical, too. We do it with the assistance of a one half-time graduate/instructor who has designed and modified our own set-up materials. In many cases, we have miniturized these materials. Also, some of the materials that were in one format were put in perhaps, a chart format or a poster format so that they could use the walls of these resident learning Centers.

We have been in all kinds of space situations there. We were housed in one residence hall in a very small booth, about the size of a telephone booth, which we jammed with as many as three kids at some times, who are going through a mini-course together.

I guess the most promising thing about this particular program has been the fact that we have not been ripped-off, with one exception: those living in Kerry Quat dormitory. They have been a little malicious in their treatment of some of the equipment, with some of the posters and such. Even in Kerry Quat, we had to threaten them only twice with the removal of the learning center, and they straightened themselves out.

... in other residence halls, especially the mixed halls, we've had absolutely nothing stolen, no equipment locked at all. We've had no vandalism and no distruction of any of the supporting materials. This is a record that we've not been able to achieve in the main learning centers, where we occasionally lose a tape or occasionally lose something that has special appeal to a student -- like a $35 cat skull or something of this nature.

I can see how a procedure very similar to our residence hall situation could be effective at a high school, for example -- removed from the campus where individuals who are studying through an extension service or kind of college-at-home program

could come to get some of the demonstration material. With just a little bit of ingenuity, of course, the packaging of materials could probably be packaged even better than ours. Certainly, if we're talking about an area outside of the area of biology, chemistry, or physics, this will require certain pieces of equipment and certain chemicals or materials with which the student should interact. If we're talking about those kinds, topic materials could be sent directly to the home and a learning center set up by the student on his kitchen table or whatever. Items like pocket projectors or even hand-viewers could be used for slides. One need not worry about cassette tape recorders, I'm sure that most students would be able to come up with one from some source.

B. Q. *If students -- tested against entry-level requirements -- fail to achieve entry into a course, are remedial courses required?*

A. This is something that I addressed myself to yesterday, with your Vice-President. He had asked if students, tested against entry-level requirements and failed to achieve entry into a course, are required to take remedial courses. I had stated, in that meeting, that the one thing that bothered me for many years is the fact that if we test the student and find that he or she does not have a particular level of competency, we have typically put that student into some sort of remedial course. With a better diagnostic instrument we could more precisely define the area of concern or the areas that may be giving the students problems.

In the past we gave them a diagnostic test that kind of tested their overall level of proficiency. When they fail to reach the required level, we put them into some kind of remedial course. It might be a one, two, or three credit hour course or even a no credit hour course.

This is like saying, "There's something wrong with you. Here's a medicine chest. There are 30,000 pills in there. Take them all. One of them is bound to work." If we could more-precisely define the problem, maybe just a few pills would work.

So, this is where we should be heading, with the idea of specifically defining deficiencies in small, very specific, remedial mini-courses or modules instead of entire courses. Well, let me give you a for-instance. A student may have a problem with passing a readiness test for a course such as chemistry.

Typically, we've sent them back to, perhaps, an entire beginning algebra course so that the student could then enroll in a fairly sophisticated, introductory chemistry course. And it's quite possible that the student understood a great deal of the subject of algebra but was deficient in just a few areas. If we can build a diagnostic tool to discern more precisely what it is he can't do, then we can give him, perhaps, just a mini-course or two and bring him up to an adequate level for him to work in the chemistry course. We typically haven't done that. We've made him go back and take the whole medicine chest instead of just a few pills.

C. Q. *How are the educationally disadvantaged, minority students, and "fast" students provided for in your system?*

A. Obviously, if the audio-tutorial system favors any kind of student, it's the slow student. We have an open learning center and students can come into the learning center any number of hours each week. If they care to, they can spend 20 to 30 hours a week there. On the other hand, the fast students can spend as little time as they care to. They can come there and spend 20 minutes in the learning center each week if that's all it takes for them to achieve the objectives. In fact, they are told, "Don't waste your time in the learning center if you already can satisfy the objectives." You know, I've had a lot of students who picked up an "A" from the course who have come in to me and said, "I hate to tell you this, but I never spent any time in the learning center." And of course my comment is, "Thank you. We needed the space. I'm glad you didn't come in and waste a carrel or waste your time. All we care about is that you can do these things at the end of that mini-course. If you can do it without listening to a tape or going through a tape in a half hour, that's great."

But, the disadvantaged student or the slower student can spend as much time as necessary. I guess I'll tell a story here, to illustrate this point. The very first semester we operated on learning for mastery in 1969, I had a gal who came up to me after our orientation session and said, "Do you really mean what you said about not being able to fail this course?" And I said, "Yes, of course." And she said, "Well, you know, I've failed 109 twice now and it's the only course I've ever failed. I've

never had a grade lower than a "C" in any other course, but I've failed this one twice." She went on to say, "As I understand your system, it appears that if I want to, I could earn a "B"; and that's what I think I'm going to do."

I tried to talk her out of it; I told her, "Why don't you just settle for a "C" and get the course finished?" She was a senior trying to graduate. She had to have 109 in order to do it. She said, "No. You know, this course has made me feel stupid; and I don't think I am. And now I have an opportunity to prove to myself that I can get a "B" out of Zoology because of this system you've outlined."

And I again tried to convince her, "Why don't you just finish the course and get a 'C'? You know, that you're going to graduate at the end of this year." She said, "No. I may not finish the first semester, but I'm going to get a 'B'."

And, she did. It took her two semesters; but in her final semester she got a "B". It was not possible for her to do it under the old system. She did it by spending 20 hours a week, in some weeks, in the learning center, but it meant that much to her to have that particular opportunity.

That's not typical in most courses, obviously. The fast students are encouraged to move down the track a little faster than the regular student, in the amount of time he or she may spend in the learning center each week. During their first enrollment, if they are in 108 or 109 first, it really doesn't matter which one they come into first. But, whichever course they are in, they are encouraged in that first encounter with Sam or me to, if possible, "bank" as much of the next course as they can during that semester. In other words, as long as they are completing mini-courses in one course, it's quite simple for them to go ahead and complete any or all of the mini-courses that are set up for the other course at the same semester. They simply go through the same procedures. We'll put them in a quiz section for the other course.

They think they're going to do great quantities. They can certainly do all the optional mini-courses that they want to since there are no oral quizzes on those anyway. They can simply take those quizzes in the test room with the regular student who is required to do some units that particular semester. It'll go on to their record and be banked by the computer as overload on that semester's work. We can retrieve it the next semester.

The student can complete both courses in one semester if he or she wishes to. It's not impossible for a student to complete the course in two or three weeks, instead of the usual semester, simply because of the nature of the material. Because in 108 and 109 we do have plants and animals that have been treated particular ways or show particular symptoms or deficiencies, these are available only at the time that the mini-course is set up; so, this is not a shelvable product, really. It could be if we took out the tangible items, took out the real items and went more to slides or photographs, or film; but we still believe that there is a great deal to be gained by the student with an actual contact with the tangible specimens. So, for that reason, we haven't built all these mini-courses as shelvable packages. However, I should point out that many are.

Those, of course, could be done at anytime. So, we still hold the fast student back to the regular-semester format simply because of this aspect. But at the same time, if he indeed is fast and wants to do some extra work, he can complete both courses in the single semester, since both courses operate both semesters. The materials are set up in the other learning center for the other courses.

D. Q. *What promotional methods have you found most effective in attracting students into your system?*

A. This really doesn't have any significance for our program. Most of our students, about 80 to 90% of them, come to us because they are enrolled in a program where 108 and 109 are required courses; but we get 10, 20, or as many as 25% of our students who have been attracted into the course for other reasons, students who are either majors and should be in another sequence but they want to take this sequence because of its audio-tutorial nature. Some students simply want to learn a little Biology and have decided that this might be one of the more painless ways to learn it. So, we do get students outside of our required students in the course simply through word-of-mouth.

E. Q. *Do you require your producers of learning modules to demonstrate competence in their area before employing them in your system?*

I pointed out earlier that, in many cases, some of our learning modules have been produced by graduate teaching assistants or, in a couple of cases, by students enrolled in the course at that time or by students who had been enrolled a semester or two before. I have never really required anybody to demonstrate their competence in that area because it's been my responsibility, obviously, to approve the behavioral objectives, the mocked-up study guide before it has finally gone into press, and the tape script. So, my check on their competence has been my own competence in the area.

Hopefully, we haven't made too many content errors or haven't left too much slip past. I guess my feeling is that the competence of the individual can be checked very easily by a subject-matter expert from whatever source. I wouldn't stop anybody from doing any kind of developing or producing if the exuberance is there or the desire to produce is there. I think that is what is the most critical factor as far as getting decently produced and decently developed mini-courses or modules.

F. Q. *Do you have an educational technology workshop by which all personnel are taught the pedagogy of self-contained learning modules?*

A. This really does not apply to my particular situation. People who have developed, typically, for my course are those that have been involved in the course and have had enough exposure to the whole process applied to mini-courses, as we've used them, to come by the ability to produce or to develop quite naturally.

I have been involved in many workshops, obviously, of different durations. We've had two summer workshops where we've brought 30, 35 people into Purdue and helped them develop a mini-course or two. I've conducted probably a dozen two-day workshops at campuses all around the country, where I've simply exposed the staff members of some small colleges or departments in larger colleges to a two-day, very intensive workshop on developing a very short mini-mini-course, as we might call it. I've been involved with AIBS for two summers, during their regular and their annual conference, in taking a group of 20, 30 people through a five-partial-day workshop experience in developing modules either in PSI format or in AT format.

So it can be done. You can at least introduce people to some of the problems they will encounter. Perhaps the most important thing that has come out of these workshops -- and this has come back to me a dozen times at least from individuals who have participated -- is the exposure of the individual to colleagues in an entirely different level. For the first time in most of

their careers, these people are writing something down that their colleagues are going to look at, critique, make comments about, and perhaps cause them to change their mind or to alter their path. It's typically in the area of behavioral objectives where we find this, and in the area of study guide preparation. Time and again, I've been told that the most valuable aspects of the entire mini-course has been that part of it where an individual has learned how to take criticism from his colleagues and not take it personally but to see it in the proper perspective.

Part VII

EXTRA COLLEGE ASSISTANCE

Q. *To what extent are off-the-shelf learning modules, commercially produced, used in this system?*

A. I guess my all-encompassing answer would be, "To whatever extent they can be." Early in my particular career in audio-tutorial, I discovered that I could use all the help I could get. I know that you have had other consultants who have told you how proud most instructors are; and when they look at commercial materials, they have decided that these simply aren't as good as whatever they might produce. These consultants have also pointed out that, as time goes by, the instructor typically realizes that he's not going to have time to do all that he can by himself.

Now, I have probably produced 80% of what I use, and the only reason I produced 80% of what I used is that there wasn't anything else available. But, whenever I have found commercially prepared materials that could be used, I have used them.

The problem with most commercially prepared materials is that the producer, the developer, the publisher, or the distributer has really not looked at what the market demands. They simply are not aware of what individualized instruction is all about. They have prepared, in most cases, commercial materials that are virtually unalterable. They haven't designed them to be adapted; and yet, all commercial products really have to be adapted to your particular settings and your particular students. These products must contain your inputs or they will become sterile and turn students off faster than is possible even in a traditional learning situation.

So all commercial materials that I have used I have altered considerably. In many cases, I have altered a lot of programs that were not meant to be altered. It took considerable time and effort to do this because they weren't designed with that in mind. Nevertheless, it's easier to take a half-way decent program that somebody's already worked up and spend eight, or ten, or twelve hours altering it to fit your situation than it is to start from scratch. So, it's still easier in many cases to take those virtually unalterable programs, chop them to pieces and steal what you can. You may even be breaking copy-

right laws in many cases; but if you're careful, you can probably avoid this for the most part. You'll certainly have a strong case to argue with someone on it if you don't. So be careful and glean what you can from the commercially available products.

Obviously, if you are going out searching for commercial materials, the package you buy ought to be the one designed to be altered. Many of them now are coming out in this format where they -- the distributors, producers, developers and such -- would exort you to alter these to fit your particular situation. Of course, that's the kind of package you are looking for.

B. Q. *To what extent do you use outside consultants in the production of learning modules?*

A. I have never produced any mini-course that I haven't used some form of consultation--typically, my own graduate students or colleagues in the department who are closer to the area that I'm preparing a module for.

For example, when I do a module in development, we have half a dozen developmental biologists that I can use to pick their brain and get some ideas from. Anytime I do anything in ecology, I can go to one of our two or three ecologists and get some help. But, I don't go to them and say what needs to be done. Sam, very early in his mini-course development project, discovered that this is counter-productive -- that if he goes to a group of research scientists and asks them what needed to be talked about to students on cell respiration, what most often comes out of this is a mini-course that would take a Ph.D. to understand. It would be so difficult that undergraduates could not use the mini-course.

So, instead, what I have done is to go to the colleagues or to my consultants with an outline and the objectives and say, "Is anything wrong here? Have I made a content error, or is there some area that I've overlooked?" On that basis, the consultants have been of some benefit to us.

The best consultant, obviously, on the production of any mini-course or learning modules it the student.

When someone is starting a self-paced or an individualized instructional program, they have got to be willing to produce modules or mini-courses that are not perfect. Perhaps you can call them survival kits. But, you can produce a survival kit in a much shorter period of time than you can produce a module ready for publication. And, if you put the survival kits out to the students, that's where you get your free consultation on whether it does what you intended it to do, whether it's understandable, and whether it's workable. So I have always

felt that my best source of criticism, my best course of consultant help has been the student on whom I thrust a mini-course in some preliminary form of development. As long as I have written the objectives properly and I'm satisfied that I have designed my evaluation to revolve around these stated objectives, I will find out from the students if I develop a poor mini-course.

If I've made it more difficult for them, I still hold them to those objectives. They get there one way or the other. They tell me what's wrong with the process of getting them there and that's what we want to find out. That's what we have to change.

I think my primary responsibility, obviously, is getting the right set of objectives in the first place. What you design as a learning package to get them there is not as important. You'll find out what works and what doesn't work. You have all of those free consultants who are very happy to tell you what's wrong with it.

Part VIII

PLANNING - YEAR

A. Q. *Please list the major activities and events that must be completed during the planning year; i.e., production of learning packages, developing of systems, etc.*

A. I guess this question doesn't pertain to me because I didn't have a planning year. I had a planning two-weeks. I came to Purdue with only a rudimentary knowledge of audio-tutorial. I know what it was about and I wanted to work with it. I came back in 1969, in August, right near the end of the month; and on the 15th of September, I had about 450 students enrolled who were beginning their audio-tutorial experience in Bio 109. So I had two weeks to plan and devise a system and I did. I did devise the learning-for-mastery system that we used at that time. Although Sam and I were in the thing together, Sam had been very busy and hadn't given it a lot of thought. I had been giving it some thought during the summer; so when I arrived, I did all of the planning and devising and began the course two weeks later, obviously with a great number of survival kits.

That's all that was produced the first year. All of the mini-courses were survival kits, where I used the textbook very heavily for all of the illustrations that I wanted the students to look at for any reading that I wanted him to do.

So, my study guides were primarily a little bit of, "Why are we doing this kind of thing?," and a set of objectives that I devised based on what I thought students ought to know, perhaps a page or two of some lined diagrams or some print materials that was not in the text but should be given to the student, and one or two exercises where he could put some notes down, look at some demonstration materials, and take some data, produce a graph or something of this nature, and solve a problem. So they were fairly short, fairly concise study guides that were fairly rough , as I expected them to be.

Now, I'm not so sure that that's not the way one ought to start out in a program of individualized instruction. I don't know how productive a planning year can be either for an institution

which is going to move into individualized instruction or an individual who is going to do something in individualized instruction. I guess I've seen many projects -- especially the mini-course development project -- where there was no real time crunch as far as getting production under way. I've seen too many of these not go anywhere and I think it's a rare individual, indeed, who can use a planning year wisely. I think a planning year -- in most cases for most people who are starting to do something -- will be a somewhat frustrating period of inactivity in terms of building the system and tearing it down, building another and tearing it down, devising some modules and tearing them down, devising some more and tearing them down, and never really getting anything done. A couple of weeks before the students are going to walk in the door, they'll probably go back to producing survival kits. I guess I feel that that's the way to go because it worked for me.

I know that what I would do with a planning year another person would do differently, but I have not seen it yet. Any situation I've seen that was given time for planning was a total waste of time with periods of terrible inactivity.

The mini-course development project that Sam cranked up in 1970 went over a year before it had one module on the shelf, and that module was not a whole bunch better than the survival kit that I produced at the rate of two or three a week, in the first semester of my existance in the audio-tutorial, mini-course mastery format.

I guess what I'm saying is that probably few, if any, modules are going to survive from the planning period when they go out to the students. Maybe we ought to be more concerned with jumping in with both feet and try then to stay afloat to keep from drowning.

One way that this can be done, of course, is simply give an instructor some students -- but, at the same time, very much reduced load -- and say, "O.K., this is your responsibility. This semester, or this quarter, or this year or whatever, you individualize it. There are 50 students, 100 students or a couple hundred students enrolled. You won't do anything else except this course, but you have to burn some midnight oil. You're going to put in an 80-hour week, perhaps, that first semester to survive."

If you are paying them overload for the extra hours and at the same time, taking away most of his other duties, I think you'll probably get a better product than if you simply tell him to produce materials without students.

You suggested to me that you're going to pay them to do these things, and maybe that's incentive enough. But, I wonder how much feet dragging you'll have with those individuals, even though they're working for money. You know, I caught your

"no tickey, no shirty" plan, but I wonder how many modules you'll have produced under that situation and how many more you may have produced if you have an instructor jump full-time into a course that he or she must individualize as they go along.

Part IX

IMPLEMENTATION YEAR

A. Q. *Please list the major activities and events that must be accomplished during the implementation year; i.e., field testing, evaluation, admissions, etc.*

A. The implementation year, of course, makes more sense because there are a great number of things that must be accomplished during that year. Indeed, any kind of module produced must be field tested, evaluated, and revised perhaps several times during the implementation year. By the way, that question doesn't really pertain to my situation; so I can't do anything else about it.

Part X

BOOKSTORE

A. Q. *What involvement does the bookstore have in the selling of software to students?*

A. We've run the entire circle several times in our own situation. I talked about survival kits. Survival kits are so poorly produced, so poorly done, that I would never have expected a student to buy those particular kits. But in the smaller schools, you can't give away a few thousand dollars worth of paper. In a course as large as ours, we probably gave away $5,000 worth of paper each semester. It would be quite easy to charge a straight course fee to offset the print costs for anything you produce that first year or the first couple of years, as you go through revisions. Eventually, after perhaps two to four revisions, any mini-course or module might be in a form suitable for printing. It can then be sold to the student on a cost basis. Our A8, a mini-course on transport, is now at that level.

I've been in the business since 1969, and it was only this year that we started selling mini-courses to the students. So, you can see that there was a considerable period of time that we gave away the paper free to the students. But we finally had enough art work done. We'd cleaned up the study guides enough that we felt comfortable enough with them that we could print them with no fear of any copyright problem. If you are going to have copyright problems, you can't sell to the students, even at cost.

Really, you could give the students quite a bit of material that may seem to be violating copyright laws. You might get away with it. If you're going to sell them even at cost, materials are to be copyright free and are going to have to be revised and changed or altered enough to survive that. We finally did that after four years. We started selling booklets to the students at cost. Books were printed on the campus or printed commercially in town and still sold at cost.

At Purdue we do not have a university bookstore; so, those that we sell at cost have to be sold through the only institution on campus that can collect fees of this nature or sell items of this nature: a military bookstore at the armory. So, that's

where students buy about 80% of their study guides for 108 and 109. The other 20% are commercially produced similar to the Westinghouse mini-courses that I gave you. Those are sold to the bookstores which are privately owned around the campus.

And, so those individuals order these modules in separate batches, individually put them on the shelf, and sell them to students as they need them. As the mini-course comes up, they'll go over and buy study guides for that particular mini-course from the bookstore.

B. Q. *How are prices determined?*

A. Obviously, those that we sell on campus are set entirely by cost. Those that are commercially prepared are obviously set by the publisher of those materials.

C. Q. *Does the creator of the module receive royalties?*

A. The answer is no, for those that are produced locally, printed on campus or off-campus and sold at military bookstores. The commercially prepared packages that we use will have royalties involved for those people.

We are in a position to take those particular mini-courses that have been produced locally and give them to a publisher such as Kendall Hunt, where print is run primarily for your students and the materials are copyrighted by you. They simply print and distribute them. We will probably go that route next year, which will almost double the price of the books; but it gets us out of the book business entirely and does away with, what you might call, conflict of interest with the armory, the military bookstore, and the privately owned bookstores around the campus. It would make them feel better if we were to go with Kendall Hunt. Then, the materials would go into the bookstores around campus, would then become commercial, and would have royalties involved. If that happens, about 50% of the royalties would revert to the university itself. The other 50% would come to me since I've had about half a dozen other people involved in the production of some of these mini-courses -- their name is on them -- it could become a rather sticky problem. What I would do to avoid this is simply plow those royalties back into the course, buy equipment or whatever, and save the problem of trying to distribute royalties among the many people who have been involved in the production of that mini-course.

Part XI

EVALUATION

A. Q. *How do you handle the evaluation of the system, personnel, and other components?*

A. Over the semesters, we've handled this in a number of ways. Many of the mini-courses have been evaluated by a team of evaluators working for Sam's Mini-Course Development Project. They devised an instrument to evaluate all of his mini-courses that came out of that project and many of those that I've produced myself. We have also designed our own evaluation instrument on many occasions and have solicited feedback on specific mini-courses -- on the course in general and to half a dozen different techniques and processes. We do evaluate every new mini-course. As part of the requirements, the student must answer a series of questions that are usually made up specifically for that mini-course. There are, obviously, some that hang on from one mini-course to the next, like, "If you knew what you know now, would you still complete the mini-course?" or "Is the mini-course of adequate length", or "Did it grab you?", or whatever.

So, a lot of these questions are common to all mini-courses. We ask specifically on each mini-course evaluation whether this particular point was clear or whether we spent enough time with that idea or if we belabored any given point too long. We solicit both objective critisms or critiques through the use of specific questions and subjective notions--a paragraph from students on each new mini-course. Then we hold off a revision or two, and finally, when we think it's about ready for the final time around, we'll solicit this information again before we print and sell it.

I should point out that we felt all along that no single mini-course could be used any more than about three or four semesters, even after it reaches that perfection point, without being revised. Biology is a changing field, and we're discovering so much new information that, in our discipline, you can't be too comfortable with what you've produced. Some of the things you say are no longer quite true. We've had new information that expands the dimensions of some of the materials that's covered in the mini-course.

Part XII

COSTS -- BUDGET

Introductory Remarks

You know, this is the most nebulous of all. I'm sure that other people who have been in administrative positions, who have monitored the costs of productions of some of these materials, are in a better position to answer than I am; but I think that the figures you get have to be tempered by consideration of the kind of product they're producing.

The first year of production in a learning resource center or in a multi-media production lab is going to have probably 100 times more wasted effort, wasted time, wasted money than subsequent years. I can give you a "for instance" on this. If I were to sit down myself and produce a module, a mini-course comparable to A9 on Transports, at the level that is indicated by that study guide and the script that would accompany it, there would be a horrible number of wasted hours, bad effort, poor products -- if we were talking about what I've done on this level in 1969. I could sit down now and produce a module like this is less than a week, counting the time that I would have to have an artist, time for secretaries, time for some of the photographers to build any supporting materials, and time for my graduate students to come up with the experimental design that will work. If I had all

of my people who have worked with me in all these many years, we could do this in no more than one week's time, counting everybody's time together. It's like one full week of one person's time.

If we were doing this same thing in 1969, it would have been a semester, perhaps, of everybody's time -- we're that much farther down the road. We know how to put things together. We know what fits and what doesn't.

A. Q. *What is the ball-park figure for establishing a multi-media lab -- keeping in mind personnel, equipment, supplies, and student workers needed?*

A. I would have to say that you can run what I would consider a very effective program in individualized instruction for virtually no money if you have the services of part-time artist or illustrator, if you have the services of a secretary, and if you have the part-time services of a photographer. Just part-time, you can produce a lot of survival kits for the first go around in a given semester. In fact, you have to be able to produce two or three mini-courses a week in that format. But, that isn't going first cabin, and it's at a minimal.

If you're talking about a multi-media production lab for this campus, you obviously are going to need, as far as personnel are concerned, a full-time illustrator and a couple of full-time secretaries if you have three or four staff members designing modules. You're going to need at least a half-time photographer, you'll need two or three student helpers -- individuals who can mock up study guides for you, cut and paste, copy people whatever you want to call them -- and errand runners. If you are going to do any work in television, obviously, you are going to need a full-time television technican and a full-time, producer/director kind of person. One of these individuals is going to have to be able to handle a camera. So you're talking, for a school of this size, of a production lab for the number of people that you'll probably need in the first year or two, of a half dozen or so people. You are going to need probably no more equipment than I saw already in the learning resource center. I think you are pretty well equipped.

B. Q. *What is the cost of producing a set of learning modules composed of script, workbooks, taped lectures, film slides, and/or film strips, covering approximately 45 to 50 hours of instruction?*

A. I'm going to skip this because I have no idea. It depends on what level you're talking about. I've given you some ideas of time for producing survival kits, and some ideas of time for producing fairly sophisticated mini-courses. Once you've been in the business long enough, you'll be able to do it in a much shorter developmental period. And, really, there's no way for me to put any cost on this because I have never been involved with that aspect of it.

C. Q. *How many hours of production effort are required to produce one hour of multi-media learning?*

A. And, again, this is so relative that it's an impossible question to answer. Are you talking about producing a survival kit, using the textbook and getting people off the ground; or are you talking about a fairly sophisticated mini-course? Some people will say that -- and Sam would probably go along with this -- it would probably take an average of perhaps 120 hours to produce a good mini-course, in publishable form. It's a pretty costly thing. They are going to cost a lot of money. Now, our mini-courses are not nearly as long as some of the modules that other consultants have talked about; so their figures for that kind of production probably is much more reliable than my own.

D. Q. *How does the cost-effectiveness ratio of your system compare with the cost-effectiveness ratio in lock-step systems?*

A. Again, I talked to you about this extensively. If you are talking about personnel to operate a system of this nature, it's not any different than that needed for an individualized instructional format. The individualized instructional format is going to have a greater input in terms of equipment in order to operate it, to mediate and form it all. I do believe that individualized instructional materials ought to be mediated. Stay away from just the print format. Take advantage of some of the audio-visual materials that are available to us now. It ought to be truely a multi-media operation where you use print materials and you use tangible items, and you use projected materials and you use audio materials. You use every input that you can possible to accomplish the task that you set for yourself, and for your students. So, if you are going to have some form of mediation, it's going to cost a little more money definitely.

You and I have talked talked about the possibility and the probability, in a situation like we have here, of reducing costs

considerably by involving fewer senior staff members with some of these courses and involving more para-professionals or students enrolled in the course to function in the learning resource center or to function as tutors or proctors for any aspect of the program. So, on that basis, it could be very, very cost effective in reducing the number of highly paid professional staff people that you have to have.

Part XIII

MISCELLANEOUS REMARKS

There are a couple of things that I would like to contribute that you may not have considered before. When you go to build or furnish or supply your learning resource center, there are some problems you could encounter and some things you should be aware of.

I guess we're prone, when we go out and get grant money, to buy the best of everything. I should caution you that, as far as I can figure out, if you're going into any kind of audio program, use audio cassettes. There is no other really reliable inexpensive, first-class cassette system in existance. There are lots of systems that involve a $500 cassette player that isn't worth the power to blow it to hell. I think that if you start thinking of equipping your learning center, you should look very carefully at play-back-only cassettes, such as the Audiotronic or the Hatachi, or one that has only this particular mode and sells for maybe $25 to $40. That's a kind of throw-away item that gives you fairly decent fidelity, and at the same time, doesn't tie you up with the $500 piece of equipment you're going to have to throw away. I would not waste my money on a high speed cassette duplicator because virtually every one of them on the market wears tapes out about twice as fast. It stretches tapes and causes them to break, or pull off the sprockets, or get wrapped up around the spindels, or

whatever. So I could consider duplicating my cassette tapes on a bank of recorders such as a $150 "Wallensack," which records on a one-to-one basis. You have a bank of about 10 to 15, and you can record that many at one time. It's not too bad a situation and you can buy 10 of those for $1500. Don't pay over $2000 for a high speed duplicator that will take about three or four tapes through in about three minutes. If you have a bank of about 10 or 15 of these on a one-to-one basis, in the final analysis, it's not that much different. But your tapes will last you two or three times as long.

As I pointed out before, I'd stay away from such lock-step equipment as sound-on-slides. You're much better off if you have a carousel projector and the cassette player. Simply train your students to push the button and advance the slide. It's a lot cheaper; it just makes an awful lot more sense. You don't want to get into automatic advance systems or anything of this nature.

The only television format that can take the student punishment -- it's relatively student-proof -- is, of course, the Sony Unatic System. It is very good and quite reliable. For small enrollment courses and for someone who wants to get into the video-format, this makes an ideal tool to individualize some aspects of instruction.

There's no reason for going to video unless you're doing things, of course, that can't be done as well in another format. So many times, video is used by someone as kind of a game or a gimic. The individual has taught exactly the same way that he or she has taught without the video. And the same is true, of course, in an audio-format.

So, your biggest problem is to convince your people that when they individualize their courses, they are going to have to change their whole style, their whole approach, and scrap what they've been doing in years past. That's not individualized instruction, as you well know.

Just one other thing, and we discussed this, Mario. I believe that you should point yourself ultimately to permit a student to walk in off the street any day of the week and begin a course or a program in any of your programs that you offer on campus. In other words, that's the ideal. That's the place where we're heading, where any day of the week a student can decide to come to Camden County College and begin a course in business, electrical technology or whatever, and there will be mini-courses or modules that must be completed for that particular certification. A student can start tomorrow, and finish it as soon as he gets through these learning packages. That's where we all ought to be going, but certainly that's where the community college has to go if any form of individualized instruction is successful. I'm sure you are aware of that, and I'm sure that's where you want to go. That's the kind of thing that you ought to address to the faculty and to your administration. That's also the way to reach those other groups that you had outlined in your proposal. It's most satisfying to someone like myself to see people address themselves in the community college to those populations.

You didn't ask for this, but I'm going to tell you about learning-for mastery systems. I think you have to examine the possibilities because you may not want to hold out for a system where a student must

achieve at an "A" or "B" level. Maybe you'll want to set your standard at some lower level, say at a "C". We use a system where "C" is the minimal standard. We have students do different things for "As" or "Bs". Now, it's true that most of our students get "As" or "Bs" -- in fact about 80% of them -- but we set the minimal standard at a "C" level just to prevent problems for ourselves in terms of requiring more from a student than is actually needed for him to succeed in whatever he is trying to do. So, you may wish to make those kinds of considerations.